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# ASTHMA: SOME ASPECTS OF OUR PRESENT KNOWLEDGE.<sup>1</sup>

By CHARLES SUTHERLAND, M.B., B.S. (Melbourne),  
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Melbourne.

I MUST first of all thank you for the compliment you have paid me in asking me to lecture to you tonight. I feel rather diffident in lecturing on such a specialized subject, but ill health due to hypersensitiveness is apparently very common and one authority in America estimates that 7% of the population suffer to some degree from this cause.<sup>(1)</sup> Hypersensitiveness is a big subject and I think it will be better to touch only lightly on description of signs and symptoms and spend more time on recent developments.

Of course, the most important diseases in this group are asthma and hay fever, but there is no doubt that some cases of urticaria, angioneurotic oedema, eczema and vasomotor rhinitis are due to similar causes. Occasionally one finds, especially in children, that persistent eczema is due to some particular food (for example, eggs) and it disappears completely when that food is eliminated from the diet. Then probably all of us know of individuals who get hives after eating such foods as fish, nuts or strawberries. In these cases there is no doubt about their idiosyncrasy, but many skin conditions are less clearly defined and we get our most convincing evidence in favour of the theory of hypersensitiveness when we study asthma and hay fever.

The symptoms of asthma in a typical case leave no chance of missing the diagnosis. The outstanding features are great obstruction to expiration with the accompanying wheezing, the periodicity of the attacks and the complete freedom from symptoms and signs between attacks. An additional point is that adrenalin will abolish symptoms completely for a short time. Differential diagnosis is from other forms of dyspnoea. In renal and cardiac dyspnoea there is usually an abnormal demand for air and no evidence of bronchial spasm. Then, of course, there are the other evidences of renal or cardiac disease.

A foreign body in the bronchus may simulate asthma very closely, but a carefully taken history may raise suspicions and indicate X ray and bronchoscopic investigation.

Recurrent bronchitis in infants occasionally turns out to be due to hypersensitiveness and, of course, it is very important not to miss these cases if treatment is to be effective.

## Mechanism of the Attack.

The patient suffers from dyspnoea owing to obstruction in the smaller bronchial tubes. This is due to three factors: (i) Spasm of the bronchial muscles producing constriction, (ii) swelling of the

bronchial mucous membrane, (iii) secretion of extremely tenacious sputum; Chevalier Jackson has observed the bronchi during attacks and he particularly stresses the importance of this thick sputum in obstructing the airway.

The cause of the attacks was a complete mystery until it was realized that the majority of these patients are hypersensitive to some substance. Hyde Salter<sup>(2)</sup> in 1864 described his attacks of asthma which almost invariably followed contact with cats. He noticed that if he stroked a cat his eyes and nose would itch and run and later asthma would supervene. If a cat scratched him, a large urticarial wheal would develop in a few minutes. He noticed that fur from kittens was more potent than from adult cats. One of my patients is similarly very sensitive to cats and says he can tell at once if a cat has recently been in a room. I can quite believe this, as a small drop of a weak solution of cat hair produces a large wheal on his skin and a minute drop in his eye produces an immediate congestion and intense itching.

Hypersensitiveness or allergy is similar in many ways to a state of anaphylaxis, but it is not necessarily the same. To render an animal anaphylactic it is necessary to give a preliminary sensitizing dose of protein, whereas hypersensitive individuals often manifest symptoms with their first contact with the offending substance. Then, again, the reaction in hypersensitive subjects occasionally is quantitatively much more violent than in anaphylaxis. Another difference is that in anaphylaxis precipitins can usually be demonstrated in the sensitized animals, whereas in natural hypersensitiveness in humans it is exceedingly rare to find them.

Even now some authorities deny the importance of hypersensitiveness, but there is no doubt at all that it is the most important factor in many instances. It is perhaps most convincing in seasonal cases. I have a number of patients who get asthma only between October and January and are entirely free from symptoms during the rest of the year. In all of them I have been able to detect sensitiveness to some pollen which is produced only at that season and desensitization relieves practically every patient.

Often the patient himself has no doubt about it and can indicate definitely what upsets him and skin tests usually confirm his statements. Several have told me they get asthma near horses and skin tests gave good reactions to horsehair. Others have been aware of sensitiveness to cattle hair, rabbit fur, parsley, honey, fish, milk and iodoform and each reacted well to the substance concerned. I have quite a number of patients who are extremely sensitive to aspirin, but I have never seen any sign of a skin reaction to it.

It is now quite easy to transfer hypersensitiveness from a patient to the skin of a normal subject. If a drop of serum from a patient sensitive to horsehair is injected into the skin of a normal person, an area as large as a penny becomes sensitized so that if twenty-four hours later we inject a drop

<sup>1</sup> Read at a meeting of the Eastern Suburbs Subdivision of the Victorian Branch of the British Medical Association on August 3, 1928.

of horsehair extract into that area, a large wheal is produced, whereas if it is injected into the untreated skin no reaction appears.<sup>(3)</sup>

The substance in the serum which conveys this power of reaction is called reagin. Several times transfusion of blood from a sensitive donor appears to have sensitized the recipient. Ramirez<sup>(4)</sup> mentions a patient who received a transfusion of blood. Later he went for a drive in a horse-drawn carriage and was seized with asthma. He had never had it before and it was found that the donor was an asthmatic and was very sensitive to horsehair.

A very interesting fact was found by Walzer<sup>(5)</sup> in America. He sensitized the skin of a normal person with a serum from a "fish-sensitive" subject, that is, he injected 0.3 cubic centimetre of the patient's serum into the normal person's skin. Next morning this sensitized individual ate some raw fish for breakfast and in a few moments noticed itching at the sensitized site and in a few minutes a well marked urticarial wheal had developed.

It seems revolutionary to think that products of digestion are absorbed in such an intact form from the normal bowel and can reach even the skin capillaries in a few minutes. It used to be assumed that food-sensitive individuals possessed a specially permeable mucous membrane which allowed incompletely digested foods through, but apparently it is quite normal for them thus to pass through.

All the phenomena of uncomplicated asthma appear to be due to the formation in the tissues of a substance which has properties similar to histamine.

If a patient's skin reacts to horsehair, we can imitate this reaction perfectly by applying histamine. This drug also causes spasm of the bronchiolar tubes and congestion of the mucous membrane and in animals it will reproduce most of the symptoms of anaphylactic shock perfectly. Sir Thomas Lewis has done much work on the formation of this histamine-like substance. Apparently any form of injury will cause the tissues to liberate it.<sup>(6)</sup>

In asthma one imagines that the offending substance, for example, pollen, falls on the mucous membrane and is absorbed by the cells there. It meets with the specific reagin and an intense poison is liberated. This damages the tissues and they liberate the histamine-like substance to the circulation and then all the phenomena of asthma follow. Any tissue that is minced up finely, produces histamine, but it is found that some tissues yield much more than others and it is suggestive that the lungs yield a much larger quantity than other tissues.<sup>(7)</sup>

Dr. Fiddes and I have recently been studying bronchial spasm in guinea pigs. We destroy the medulla and keep the guinea pig alive by mechanical respiration and record the lung volume on the smoked paper of a kymograph. If we give one-fifth of a milligramme of histamine intravenously, the bronchial spasm is so intense that no air can enter or leave the lung and, if left, the animal dies of

asphyxia. If we inject one-fifth of a cubic centimetre of adrenalin (1:1,000) the spasm disappears almost at once.

If, before injecting histamine, we give atropine, it is impossible to produce any bronchial spasm. Atropine is also useful in relaxing spasm produced by histamine and thus we have striking laboratory demonstration of the usefulness of a drug which has been used empirically for years.

Thus the mechanism of attacks in definitely sensitive patients is becoming fairly well understood, but there is still a number of typical cases in which the mechanism is a complete mystery. Some absolutely typical patients have violent attacks of asthma alternating with spells of complete freedom and yet no factor seems to influence the attacks and all skin tests are completely without result. These patients get no relief from change of locality, nor does the season affect them. The inference is, of course, that the patient carries the cause about inside him—so-called intrinsic asthma. Many of these cases are probably due to bacterial hypersensitiveness and elimination of focal sepsis is often most effective. Vaccines sometimes help also. A few others seem to be due to reflex irritation, especially from nasal abnormalities. Atropine helps these patients as a rule, but there are still some who get typical attacks, and no likely cause can be found. It seems possible that some queer metabolic product may be responsible.

Archibald Garrod in his book on "Inborn Errors of Metabolism" shows how certain individuals form peculiar metabolic by-products and it is just possible that these act as foreign proteins in individuals predisposed to hypersensitiveness.

Apart from theory there are a number of very interesting facts. Many women with asthma completely lose it when pregnant, although it returns after the child is born. Similarly, a woman subject to hay fever may be quite free of symptoms during the season if she is pregnant. I know of several patients whose attacks are worse at each menstrual period. As a rule the two days preceding menstruation are the worst and with the onset the asthma disappears.

Occasionally a severe illness, such as typhoid or pneumonia, will cure a patient perhaps permanently. One of my patients has malaria and he always has three days of complete freedom from asthma with each attack of malaria. Another patient with persistent asthma developed myxœdema. His asthma then left him, but as soon as the myxœdema was corrected with thyreoid, the asthma returned.

Tendency to hypersensitiveness is inherited as a Mendelian dominant characteristic.<sup>(8)</sup> If neither parent suffers from hypersensitiveness, it is unlikely that the children will suffer. If both parents are hypersensitive many of the children will probably show it, but it is only the tendency which is inherited. The child is seldom sensitive to the substances which upset his father or mother. I have seen one group of patients who are all related. Among six families of them there are twenty-seven hypersensitive individuals and I have been able to



test eleven of these. In one family the mother is sensitive to horses, her daughter to feathers and the son to house dust. The aunt is sensitive to rye grass and gets typical seasonal asthma from October to January and is free the rest of the year.

It seems likely that in many cases the particular hypersensitiveness is acquired. That is to say, an individual with a predisposition to become hypersensitive starts simply with this predisposition, then repeated exposure to some substances establishes hypersensitiveness to it in some way not understood at present. This is well illustrated by the different incidence of sensitiveness in different countries. In America rabbit fur is commonly used as a filling for pillows, especially among the poor class Jews. There rabbit fur sensitiveness is apparently quite common, whereas in Australia it seems moderately rare. To become sensitive one needs very close contact with the dry substance and probably the individual gets larger doses from a rabbit fur pillow than from, say, rabbit trapping in the open air.

Chemists after years of exposure also seem suddenly to acquire hypersensitiveness to powdery substances, such as ipecacuanha, cocaine and quinine and orris root and workers with nickel sulphate seem to become suddenly sensitized to it, so that they develop dermatitis whenever exposed subsequently.

Hypersensitiveness to these comparatively simple compounds, like nickel sulphate and quinine and aspirin, seems rather surprising, but there is no doubt that it is fairly common. I have seen over twenty patients who cannot tolerate even small doses of aspirin, and I have twice seen desperate attacks of asthma follow within twenty minutes of swallowing 0.6 gramme (ten grains). In one case it seemed that only heroic doses of adrenalin saved the patient.

One of my patients developed his first asthma shortly after operation for hydatids seven years ago. Since then he has had it almost continuously. A very thorough series of skin tests failed to produce a reaction, but he still gives a good Casoni reaction to hydatid fluid. Treatment of the asthma with vaccines, peptone and tuberculin was tried, but there was practically no improvement. Then I thought that we would try desensitizing to hydatid fluid and he started to improve immediately. The first subcutaneous injection produced much local reaction, but after the fourth dose there was practically none, so apparently it is possible to desensitize very easily. After the fourth injection he remained almost free of asthma for six weeks, but since then he has relapsed in spite of further injections.

#### Detection of Hypersensitiveness.

When you have decided that the patient is suffering from definite asthma, the most important thing is to find out whether he is hypersensitive to any substance. It is useful to classify all patients into one of two classes: (i) extrinsic asthma, (ii) intrinsic asthma.

If he is upset by causes outside his body, such as pollens and dusts, his asthma is due to extrinsic causes. Such a patient notices that he is free of symptoms in certain localities and ill in others or he may be free of attacks in certain seasons and bad in others or he may notice that contact with animals, such as horses, will bring on attacks.

On the other hand, some patients with definite asthma are equally bad in any locality and in any season and can detect no factor which makes them worse. In such patients it is assumed that the cause lies inside the body and probably it is bacterial in most cases, for example, infected sinuses.

Having decided whether a case is due to intrinsic or extrinsic causes, we next proceed to test for the specific cause.

If it appears that intrinsic factors are responsible, it is still worth while to test with the commoner substances, such as epithelia and dusts, as one can never be quite certain in classifying cases. Tests with bacteria are worth trying, but are usually disappointing.

In extrinsic asthma we can expect at least 70% of patients to give definite skin reactions. If the patient is ill only in the spring and summer, try the pollens first, but if he is ill more or less during the whole year, start with the epithelia and dusts. The best test reagents available in Melbourne are prepared by the Commonwealth Serum Laboratories in liquid form. It is safe to use the strongest strength supplied, if one is doing scratch tests.

I usually use the skin of the forearm for tests. With a moderately sharp scalpel make fifteen small cuts in the anterior surface. These are best arranged in three rows of five. Each cut is about three millimetres (an eighth of an inch) long and is just deep enough to show a pink line of corium underneath. It should not bleed, as this will dilute the reagents and may spoil the test. The cuts should be at least 2.5 centimetres (an inch) apart.

Then take a wire loopful of the test reagent, hold the little cut open by stretching the skin away on either side and rub the reagent well in and allow the cut to close again. Apply a drop of the next reagent to the second cut and so on. Fifteen tests should take about ten minutes and then they should be observed for about thirty minutes. As a rule reactions appear in about ten minutes. A flush is seen round the cut and itching is felt. Then a small white urticarial wheal forms and spreads cut irregularly with pseudopodia.

If the tests yield no result, we can repeat them using the intradermal method, but it should be a rule never to test intradermally unless the reagent has been tried first on a scratch. Very severe symptoms suggestive of anaphylaxis have followed the injection of as little as one-hundredth of a cubic centimetre and several deaths have occurred.<sup>(9)</sup> But if the scratch test yields no result it is probably quite safe. I use ten glass tuberculin syringes fitted with the finest rustless steel needles (No. 20) with the points ground to only a short bevel. See that no air bubbles remain in the syringe before use, as these would give rise to "pseudo-positive"



results if injected. Then insert the point of the needle into (not under) the skin of the forearm and inject about one-hundredth of a cubic centimetre. Observe for twenty minutes. Reactions are usually much more pronounced than with the scratch. Of all patients tested about 55% react to "scratch" tests and a further 15% to intradermal tests. These 15% form a very important group, because it is the slightly sensitive patient who usually does best with treatment. The patient who gives a most convincing reaction to, say, horse dander, will certainly be benefited by specific treatment, but it may be years before he is completely free of symptoms.

On the other hand, if a reaction can be elicited only by an intradermal injection, he may be relieved in a few weeks and remain free for years. As a rule, if the result of a skin test is strongly positive, a drop of reagent in the eye will cause rapid congestion of the conjunctiva. If this reaction is becoming too severe, a few drops of adrenalin (one in a thousand) will make it disappear in a few seconds. It is a useful and harmless way of confirming the skin test.

#### What Tests to Use.

In choosing tests start with the most probable. Horsehair is a good one to start with and follow with feathers (hen, goose and duck), house dust, furs (cat, rabbit and fox), cattle hair, goat hair, sheep's wool and kapok. Orris root is used in making face powders and scents and quite commonly gives big reactions. (It should be used in powder form as the liquid extract may not keep well.) Le Page's glue is used in sticking furniture and after years it flakes off and forms dust. It is liable to cause very violent reactions and has caused fatalities. Linseed is also worth trying.

For hay fever and seasonal asthma test first with wind-borne pollens. In Victoria rye grass, prairie grass, cocksfoot, *bromus mollis*, plantain grass, *poa annua*, *poa pratensis*, canary grass, capeweed (and other *Compositæ*) and our native kangaroo grass are all important. Iceland poppy, sweet pea, dahlia, carnation and sweet-william occasionally cause trouble; also Yorkshire fog, privet, sorrel, chenopodium and Murray pine.

Foods are of more importance in children. Often the food sensitive patients complain of hives, eczema or abdominal discomforts as well as asthma. History is again important in selecting tests, but egg, milk, oatmeal, wheatmeal, peas, rice, maize, nuts of various sorts, parsley, pears, coconut, honey, pork are among the more important. Fish sensitiveness does not appear to be so common in Australia as in other parts of the world and this suggests the interesting possibility that because we eat less fish fewer individuals acquire sensitiveness. As a rule it is best to use fresh foods rubbed up with 1% normal sodium hydroxide, as many of the extracts appear to be inert after a few weeks.

One important thing to test with is dust from the patient's own home. Dust from a vacuum cleaner is best or it can be got from the top of a

wardrobe *et cetera*. Wash a pinch of it in ether for twenty-four hours to get rid of most of the fat and bacteria and then apply some of the dry powder to a scratch moistened with 1% normal sodium hydroxide. Often when all others yield no result, this will give a good positive. If it does cause a reaction, try it on a normal individual to make sure it is not simply irritating. It is not known what the active substance is.

Aspirin gives rise to violent asthma in certain individuals, but unfortunately it does not appear to react in the skin so that one must depend on the patient's observation here.

Other simple chemicals, such as iodoform, ipecacuanha, quinine, cocaine and nickel sulphate can act in a similar way. One observer<sup>(10)</sup> recently has traced a number of cases of eczema in the genital regions to idiosyncrasy to quinine used as a preventive pessary. Either the husband or wife may suffer. Hypersensitiveness to these comparatively simple compounds is interesting because many of the offending substances appear to be proteins with large molecules.

#### Treatment.

I have dealt with treatment in more detail in another lecture.<sup>(11)</sup> In an acute attack adrenalin is still by far the most useful remedy. Sometimes 0.2 cubic centimetre (three minims) subcutaneously is sufficient, but more often five minims is a better initial dose. If necessary repeat the dose every fifteen minutes until relief is obtained. There is an optimum dose for each patient and I have seen some who require as much as 1.2 cubic centimetres (twenty minims) before any effect is obtained, but, of course, one should always try smaller doses first.

For mild attacks the new drug ephedrine is useful.<sup>(12)</sup> This is an alkaloid obtained from the Chinese plant *ma huang*. Its formula and pharmacological action are similar in many ways to those of adrenalin, but it can be given by mouth and, although it takes twenty or thirty minutes to act, it maintains its effect for six or eight hours. The usual dose for adults is 0.03 gramme (half a grain). Some individuals get unpleasant effects such as palpitation and tachycardia, sweating, tremor and sleeplessness and it is wise always to warn the patient of this. A child of eight can usually take 0.015 gramme (one-quarter of a grain) by mouth. I practically never give ephedrine for severe attacks, because it seldom relieves and if adrenalin is given after the ephedrine it often upsets the patient, but for the patient with frequent mild attacks it is often invaluable. Of course, morphine and atropine and heroin are also useful in certain cases. Sometimes adrenalin (one in a thousand) inhaled from a fine nebulizer is useful. Cocaine 4% is more effective, but there is a real danger of habit formation.

#### Curative Treatment.

Efficient treatment depends on thorough investigation. Always search for focal sepsis or other causes of ill health. Occasionally reflex causes are

important, for example, deflected septum and occasionally deficient secretion of hydrochloric acid in the stomach seem to dispose of attacks, but I have been disappointed with results from gastric therapy.

If skin tests reveal a definite hypersensitiveness to a substance such as horsehair, we can expect a great improvement in symptoms by a thorough course of desensitization. This usually takes sixteen or twenty injections and may take considerably more. I always begin with a dilution of the extract which produces only a very slight reaction if injected intradermally. It is usually safe at each visit to give double the previous dose and thus rapidly to work up to a dose which gives some reaction at the injection site. When this reaction becomes pronounced after each injection, do not increase subsequent doses so rapidly, as too large a dose is liable to cause asthma or it may make the patient uncomfortable in some other way (vertigo, headache or lassitude).

If the patient is sensitive to several substances, it is more difficult to treat him specifically, but it is still worth trying, although often it is better to try non-specific therapy first. Prophylaxis for hay fever is given on exactly similar lines with the appropriate pollen extract. If the patient is sensitive to foods, it is better simply to avoid them or, if this is impossible, we can desensitize quite effectively by mouth. For example, if sensitive to egg white, give 0.06 gramme (one grain) by mouth one day, 0.12 gramme (two grains) next day and so on until he can tolerate a whole egg. Once tolerance is established, it is important that he should not abstain from the food for more than a few days, otherwise the intolerance may reappear.

#### *Non-Specific Treatment.*

Peptone is the best known method. Witte's peptone is very variable and very dangerous. Armour's Number 2 appears to be quite safe and has been in use for years.<sup>(13)</sup> I have never seen any ill effects apart from a mild rigor occasionally. Occasionally it is effective, but the benefit is usually transient.

Vaccines are sometimes useful. I find that stock ones are often better than autogenous, but I have seen autogenous succeed when the stock one was quite useless.

When milder methods fail, old tuberculin may succeed brilliantly. The rationale is not very clear, but probably it was noticed that tuberculous asthmatics lost their asthma during tuberculin treatment. Those with a positive result to the von Pirquet test seem to do best. Of course it must be used very cautiously, but I have never seen any harm result and sometimes results are excellent.

Drugs are not usually of much use, but iodides are sometimes very helpful. Sodium iodide is much better than the potassium salt. It seems to loosen the sputum better. Large doses are sometimes necessary—up to 1.2 or 2.0 grammes (twenty or thirty grains) thrice daily. Atropine is often a useful addition.

#### **Constitutional Reactions.**

If an overdose of an extract is injected into a sensitive subject, there is liable to be not only a violent local reaction, but also symptoms of general intoxication. The patient usually is conscious of generalized itching and an urticarial rash may break out all over. The blood pressure falls and there is tachycardia and collapse. Often violent asthma ensues.

Prevention is better than cure. Never do intradermal tests until you have tried the substance by the scratch method and never inject more than one-hundredth of a cubic centimetre. In giving a course of treatment do not increase the doses too rapidly and do not change from one batch to another.

If a constitutional reaction appears likely, try to check absorption of the toxic substance. Probably the most effective way is to inject 0.5 cubic centimetre of adrenalin into the site of the injection. Place a tourniquet round the arm and, if necessary, give adrenalin into the other arm. In desperate cases as much as one cubic centimetre intravenously has been given.

#### **Prognosis.**

The prognosis is very much more favourable if some definite hypersensitiveness is detected, but even when the skin reaction agrees well with the history and other features of the case, it is impossible to be sure of the results in every instance.

The best relief is obtained in pollen sensitive patients. Skin tests are usually clear cut and good extracts are available for treatment with most of the important pollens. Probably the next best patients are those sensitive to epithelia, such as horsehair, cattle hair and feathers. Most of these get a very large measure of relief and so do those sensitive to house dust. A few of my dust sensitive patients have remained free of attacks for as much as three years, but often the asthma tends to reappear perhaps six months after a course of injections and a few more doses must be given.

I have already mentioned that often those patients giving small reactions do better than those with very large definite reactions. Patients sensitive to several substances are, of course, more difficult to treat.

Those who manifest no specific sensitiveness, are in a much worse position, although it is still possible to help them considerably, but there is no clear indication of what to do and often it means trying one thing after another. Peptone, vaccines and tuberculin are all worth trying and if one fails, another may succeed.

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#### LOCAL ANÆSTHESIA.<sup>1</sup>

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THE goal of operative surgery is a shockless operation. Although it may be impossible to attain this ideal absolutely, it is quite possible so to reduce shock in the majority of cases that the patient does not appreciably suffer.

Shock is mainly due to injury of the brain cells by pain or by strong emotion, such as fear or apprehension. It is therefore essential to avoid pain and to allay fear, if we are to reduce shock to a minimum. It might easily be supposed that the brain of a patient under general anæsthesia would not be affected by the injury received during the course of an operation, since he has never been conscious of the pain. It has been proved by Crile in his work on shock and anociassociation that this is not so. The brain cells are injured by painful impressions even when the patient is rendered unconscious by general anæsthesia. General anæsthesia does not prevent the painful impressions from reaching the brain. It only robs the patient of consciousness.

To avoid shock from pain we must prevent the conduction of painful impressions to the brain by the sensory nerves. This can be done by treating the sensory nerves with local anæsthetic agents which render the nerves insensitive for a time, and yet apparently do no permanent damage to their delicate structure. To prevent emotional shock is a difficult matter in very susceptible patients.

The surgeon should make every endeavour to secure the full confidence of his patient and to reassure him as much as possible. A frank discussion of the condition will often materially assist in this direction. Sound sleep during the night before operation gives the brain rest from worry and pain. Sedatives are usually given shortly before the patient is taken to the theatre. Fear is undoubtedly reduced by this treatment and thereby shock is also reduced. General anæsthesia by securing unconsciousness completely eliminates emotional shock during the operation.

Local anæsthetics, if skilfully used, eliminate the shock due to pain, since the anæsthetized nerves cannot conduct painful impressions to the brain. Since the patient is conscious and aware that the operation is being performed, he will be apprehensive of pain. This constant fear of pain will cause considerable emotional shock. It will be seen, therefore, it is difficult to prevent shock entirely, unless we combine general with local anæsthesia. By the judicious administration of sedatives, however, we may so influence the patient's consciousness, that emotional shock ceases to be a danger.

#### Methods in Use.

Local anæsthetics may be administered by:

1. Hypodermic injection.
2. Direct application.
3. Swabbing or spraying.
4. Instillation.

Hypodermic injection of a solution of local anæsthetic is the method usually adopted in general surgery. The injections may be employed in one of three ways:

1. The solution is injected into the tissues at the site of operation either intradermally or hypodermically or both. This is known as infiltration.
2. The solution is injected into the tissues beyond the operative field and encircling it in such a manner as to affect all the sensory nerves entering the field. This is known as field block.

3. Injections are made in close proximity to the nerves whose conductivity it is desired to cut off. This is known as nerve block. For example, when the solution is injected close to the spinal column where the nerve trunks emerge from the intervertebral foramina, we get paravertebral block. When the injection is made into the subarachnoid space we get intraspinal block.

It is obvious that a very thorough knowledge of anatomy is essential to success in securing local anæsthesia.

Although cocaine has special advantages in operations on the eye and nose, "Novocain" is undoubtedly the most useful and safest local anæsthetic in general surgical practice, since it is less toxic than any other and may be sterilized by boiling without decomposition.

Solutions of "Novocain" varying in strength up to 2% may be used. It is rarely necessary to employ solutions of greater concentration than 0.5%, if adrenalin solution is added to the "Novocain." Of a one in a thousand adrenalin solution

<sup>1</sup>Read at a clinical meeting of the staff of the Mater Misericordiae Public Hospital, Brisbane, on October 16, 1928.



0.6 to 1 mil (ten or fifteen minims) are added to each hundred cubic centimetres of "Novocain" solution. This causes constriction of the blood vessels in the parts injected and prolongs the period of anaesthesia. Adrenalin is never used in cases of exophthalmic goitre, nor is it injected for intraspinal block.

A very useful preparation of "Novocain" is Corbière's "Néocaine Surrénine" in which "Novocain" and adrenalin are synthetically combined. Labat's syringe is a very useful instrument for making the injections.

#### Technique.

My experience in the use of local anaesthesia is rather limited, but I have used it with very satisfactory results in conditions of the following type: Empyema of the pleural cavity, exophthalmic goitre and in operations on the pelvic organs and lower limbs.

I propose to describe the technique followed in operations on such conditions.

#### Local Anaesthesia in Empyema.

In cases of empyema of the pleural cavity, if the patient is not cyanosed, morphine 0.015 (one-quarter of a grain), hyoscine 0.6 milligramme (one-hundredth of a grain) and atropine 0.6 milligramme are given half an hour previous to the operation. The 0.5% to 1% "Néocaine Surrénine" solution is infiltrated along the line of incision hypodermically and then intramuscularly. Time must be given for the solution to take effect before the incision is made. If the patient feels the first incision, he will be extremely apprehensive throughout the operation. The rib to be resected having been exposed, the tissues are retracted and more solution is freely injected along the intercostal spaces, above and below the rib. Again time must be given before incising and reflecting the periosteum of the rib. There is no pain caused by cutting the rib once the periosteum is reflected. Incision of the parietal pleura is also quite painless. The advantages of local anaesthesia in empyema are obvious.

#### Local Anaesthesia in Goitre.

In exophthalmic goitre one uses pure "Novocain" as adrenalin is contraindicated. Sedatives are given freely in these cases. "Luminal" 0.18 gramme (three grains) or barbitone 0.30 gramme (five grains) is given at 9 p.m. on the previous night; the dose is repeated at 6 a.m. or 7 a.m. on the morning of the operation. Morphine 0.03 gramme (half a grain), hyoscine 0.8 to 0.6 milligramme (one-seventy-fifth to one-hundredth of a grain) and atrophine 0.6 milligramme (one-hundredth of a grain) are given half an hour before the operation. Morphine 0.01 gramme (one-sixth of a grain) and atropine 0.4 milligramme (one hundred and fiftieth of a grain) are given on arrival in the theatre. Pure "Novocain" 0.5% to 1% solution is used. On both sides of the neck five or six cubic centimetres are injected through intradermic wheals half way along the posterior border of the sternomastoid muscle

in order to block the superficial cervical plexus. Field block is then employed as follows. Four intradermal wheals are raised, one in the mid-line of the neck, midway between the tip of the chin and the upper border of the thyroid cartilage, one on each side of the neck, about 2.5 or 3.75 cubic centimetres (one or one and a half inches) outside the posterior border of the sternomastoid muscle about its middle and one in the mid-line of the chest just below the suprasternal notch. The solution is now injected freely into the subcutaneous tissues along the lines joining these four points in such a manner as to cut off completely all the subcutaneous nerves running to the front of the neck. Time is allowed before any incision is made. When the gland is exposed about six to eight cubic centimetres of solution are injected into the region of the upper pole and time for it to act must be allowed before the dissection of the gland is commenced. It is necessary to avoid strong traction on the trachea whilst dissecting the gland off that structure, otherwise the patient will be roused by the pain.

#### Local Anaesthesia in Pelvic Operations.

Intraspinal block for pelvic operations and operations on the lower limbs is specially indicated where severe shock is anticipated, for example, Wertheim's hysterectomy, also where the patient is in bad condition from loss of blood, for example, fibroid disease of the uterus and in amputation for diabetic gangrene, where general anaesthesia is contraindicated or where severe sepsis occurs in a compound fracture necessitating amputation.

Corbière's pure "Néocaine" in special ampoules is most convenient and very safe. Lumbar puncture is made between the second and third lumbar vertebrae. Cerebro-spinal fluid is caught in the opened ampoule and the crystals dissolved. Solution is sucked up into a ten cubic centimetre syringe and injected together with some of the cerebro-spinal fluid which has been collected in a measure glass direct from the puncture needle. Inject slowly, with the patient in the sitting position. The sitting position must be maintained for one to one and a half minutes and then the recumbent position may be allowed. We usually have to wait about fifteen minutes for anaesthesia to set in. It is necessary to use ether after about fifty minutes from commencing the operation in the Wertheim's hysterectomy. Practically no shock results when this technique is followed.

#### Conclusion.

I would like to stress the following points:

1. The absolute necessity for effective preliminary narcosis.
2. Allow plenty of time before commencing to operate.
3. Absolute quietness in the operating theatre. Instruments are best placed on towels rather than in a dish. Plug the patient's ears with cotton wool soaked in olive oil.

4. Extreme gentleness in handling the organs. Avoid pulling on structures. Careful, sharp dissection in preference to tearing or crushing the tissues.

#### AVICENNA: THE PRINCE OF PHYSICIANS.

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AVICENNA, in Arabic Abu Ali-el-Hosrin Ibn-Abdullah-Ibn-Sina, was born about 980 A.D. in a small hamlet of the district of Bokhara. The name of the hamlet was Afshena. His mother was a native of the place and his father who was a Persian, of Balkh, formerly Bactria, acted as tax collector in the nearby town of Haimaitin, collecting taxes for the Samanide Emir of Bokhara, Nuh ibn Mansir. A few years later upon the birth of Avicenna's younger brother, the family migrated to the capital, Bokhara. Bokhara was at this time one of the chief cities of the Moslem world, prosperous and wealthy, situated on the highways between China, India and the western countries and famous especially for its culture and learning—an academic reputation created in the days of the Grecian colonization which had survived the stress of the breakup of the eastern kingdom of Alexander, the disturbances of the Seleucid dynasty, the incessant strife of the numerous Satraps of Bactria, the constant inroads of nomads from central Asia, the Saracen inundation and was to survive yet a little while amid the internecine warfare of the rival Emirs. At Bokhara, Avicenna was placed under a tutor and shewed a precocity that made him a local infant prodigy, at ten years of age he knew the Koran and much native poetry by heart.

A kindly and enlightened greengrocer taught him arithmetic, at whose shop the youthful sage doubtless learnt the rule of three whilst swinging his legs amid a display of tamarinds and pomegranates. Surpassing the greengrocer, he sought instruction in the higher branches of mathematics from a wandering scholar, half physician and half pedagogue, in fact, the tenth century representative of the medical missionary of today.

From him Avicenna learned the elements of Euclid, but he soon outstripped his tutor and began independent study aided by commentaries of logic and the *Almagest*, and Arabic translation of the *Μεγάλη Σύνταξις* of Claudius Ptolemy. When he was sixteen, he had mastered contemporary medical theory and claimed that, by gratuitous attentions to the indigent, he had discovered new methods of treatment.

For the next eighteen months he devoted himself to higher philosophy. By this he was frequently baffled and after hours of arduous endeavour to grasp the meaning of his subjects he would go to the Mosque and in hours of prayer seek enlightenment.

He worked very hard and late into the night and is said to have read Aristotle forty times, having

memorized the words without comprehending their meaning.

He found Aristotle hopelessly obscure and with another Persian philosopher might have written:

Myself when young did eagerly frequent  
Doctor and saint and heard great argument  
About it and about: but evermore  
Came out by that same door as in I went.

At this stage of disappointment he found in a second hand book shop a commentary of Aristotle, written by Alfarabius, which he bought for three drachmæ; by means of this he found the key to unlock the mysteries of the famous Greek philosopher.

When he was eighteen, having mastered the learning of his time, he sought a market for his accomplished of his rival physicians were ever cessfully to pilot the Emir through a dangerous illness, being thereupon made the official physician to that potentate. This gave him access to the royal library. It was the fashion among the Samanides to lionize scholarship, an extensive library and a retinue of the intellectual giants of the time being an indispensable adjunct to an Emir, even when campaigning.

Avicenna was not without his enemies: the less accomplished of his rival physicians were ever anxious to do him injury. He, by disposition fiery tempered, manifested great intolerance towards the charlatanism so rampant in his day. In point of fact, he had the natural impatience not uncommon today among young professional men who by years of faithful adherence to collegiate mottoes such as: "*Per ardua ad alta*" or "*τόνον τοι χροῖς οὐδέν*" have attained their graduateship to find their erudition in conflict and competition with the deeply implanted traditional, but grossly erroneous, old woman's saws which still have a firm hold on the minds of the less intelligent public. These enemies of Avicenna made capital out of a fire that destroyed the royal library, alleging that he had thus removed the source of his knowledge in order to conceal it. From seventeen to twenty-two Avicenna continued to assist his father in his financial work, but found time to write his first works, two *collections*, for wealthy patrons. These *collections* became the absolute property of their purchasers and consisted of short synopses of knowledge. Intellectual attainment was fashionable at the time and such short-cuts to culture were eagerly sought after by those wealthy enough to afford them. They seem to have been the tenth century prototype of that abomination of modern publishers sold under some such title as "*The Hundred Best Books*" and probably appealed to the same type of mind. At twenty-two Avicenna lost his father and about the same time the Samanide dynasty after a ten year long struggle came to an end, the country coming under the control of the Mahmud, of Ghazni, which lay to the south of Bokhara. This Ghaznide monarch was gathering round him an assemblage of savants, but Avicenna declined his patronage and went westwards to Urdgensh in the modern

district of Khiva, where the Vizier in regard to his scholarship gave him a monthly stipend. The pay was small and he was compelled to wander through the districts of Nishapur and Merv seeking patients and pupils.

About this time the Iranian cities were passing rapidly from hand to hand of the feudal Emirs of the Binde family who were disputing for the fragments of the Caliphate, and it is unlikely that much interest was taken in the *litteræ humaniores*. During his wanderings in 1013 Avicenna had a severe illness and for some time he was in sore straits. On his recovery at Jorjan in the Caspian he met a friend who bought a house for Avicenna to use for scholastic purposes and here he lectured on logic and astronomy. For this patron several of his treatises were written and here he commenced his "Canon of Medicine."

Later he settled at Rai, near to the modern Teheran, where the young son of the Medj Addaula ruled under the regency of his mother. Here about thirty of his shorter works were composed. The younger brother of the Emir was constantly at loggerheads with his mother, the Regent, and because of these quarrels Avicenna was compelled to leave the palace, going to Hamadan where the turbulent second son, Shema Addaula, had established himself. He was made the royal medical attendant and even raised to the office of Vizier. Unfortunately the mercenary soldiery, mostly Kurds and Turks, mutinied and demanded the death of the new Vizier. Shema consented only to Avicenna's banishment, but the physician hid for forty days in the house of a friendly shiekh. The Emir, being again ill, then restored him to his position. Soon after the Emir died and Avicenna, again in danger, hid in the house of an apothecary. Throughout these difficult times he assiduously continued his teaching, spending a portion of each evening in dictating and explaining to pupils the "Canon of Medicine" and the "*Sanatio*." Meanwhile he had written to the Prefect of Ispahan offering his services. This correspondence was detected by the new Emir who promptly incarcerated Avicenna in a fortress.

War was now raging between Ispahan and Hamadan and Avicenna successfully sought an opportunity for flight. In 1024 peace followed the success of Ispahan and Avicenna returned to Hamadan to carry on his work. He however made a bad choice of residence, for the reigning Emir was unsympathetic and the times uncongenial; so in the dress of a mendicant he escaped with some friends and after a perilous journey, reached Ispahan to be cordially welcomed by the Prince, Abu Jaafar Ala Addaula, whose retinue he joined as physician and general literary and scientific adviser. The last twelve years of his life he spent at this court and, incited by criticisms of his style, he devoted himself to literary matters and philology.

Avicenna was no stranger to the licentious living of his time and his pleasures undermined his naturally strong constitution. Whilst accompanying

the army in a raid on Hamadan, he was seized with a severe colic which he seems to have checked with drastic remedies almost as harmful as the disease; later the affliction returned and he had difficulty in reaching Hamadan.

The strict regimen that was prescribed became intolerable and Avicenna abandoned himself to his fate. The details of his final illness are very meagre, but they suggest that probably he perished from a carcinoma of the great intestine. In June, 1037, he was buried in Hamadan where the sarcophagus that contained his remains still exists. A movement has been started by The Royal Society of Medicine for its preservation and restoration.

Avicenna's character was an odd mixture of intense devotion to his work, a devouring passion for knowledge and a lifelong love of enjoyment. His admirable constitution enabled him to combine severe and arduous studies with facile indulgence, his fondness for women and wine being almost as well known as his learning. He possessed a gay heart and a great understanding of human nature. Versatile, boastful and pleasure seeking, he contrasts sharply with many of his compeers, especially the noble and saintly Averroes, the savant of Mahomedan Spain, who was Avicenna's fierce critic and whose cult rivalled that of Avicenna in the mediaeval universities of Europe.

Avicenna's custom was to spend the early part of the evening faithfully teaching, dictating and explaining to his pupils, with whom he spent the rest of the night in enjoyment, drinking, assisted by a band of singers and players—a spectacle that recalls to my mind several of my learned professors who were not reluctant to preside over a students' smoking concert.

About one hundred treatises are ascribed to Avicenna. Many of them are tracts or *collectiones* of small volume and little importance. They were, as already mentioned, written at the behest of wealthy patrons who desired an "Olla Podriga" of information. They are similar in content and differ only in form. Today they would probably be nick-named "pot-boilers."

The *magnum opus* to which Avicenna owed his European reputation, was his "Canon of Medicine;" of this an Arabic edition appeared in Rome in 1593 and a Hebrew translation in Naples in 1491. There are thirty editions of a Latin version founded on an original translation by Gerard, of Cremona. In the fifteenth century a great commentary on the text of the Canon appeared, gathering round it all that theory had imagined and practice observed.

There are also Latin translations of other works, notably the "*Medicamenta Cordialia*," "*Canticum de Medicina*," and "*Tractatus de Syrupis Acetosus*." The small *collectiones* seem to have dealt with every Arabian science, including theology, philology, mathematics, astronomy, physics and music.

His purely philosophical works were two extensive treatises, the *Al-shefa* or *Sanatio* which exists almost complete in the Bodleian Library, and a shorter form of the same work known as the *Al-*



*Nedgat* or *Liberatio*, the Latin translations of which were considerably modified by their monkish editors.

Roger Bacon mentioned a *Philosophia Orientalis*, pantheistic in tone which is now lost.

Although the writings of Avicenna are not essentially different from those of his predecessors, Ali and Rhazes, he completely eclipsed them in the estimation of the European universities. He presents the doctrine of Galen, through Galen the doctrine of Hippocrates modified by Aristotle. So great was the fame of Avicenna that he earned the title of Prince of Physicians. His "Canon of Medicine" was used up to 1650 in the Universities of Louvain and of Montpellier. It was appreciated in diverse ways, many holding it to be a veritable treasure house of knowledge, whilst others, notably Avenzoar, an eminent Spanish Arabian physician of the twelfth century, regarded it as worthless. It is distinguished by great method even to the extent of over-classification and an excessive subtilty in discrimination of disease, a fault not uncommon in modern text books. It consisted of five books, the first and second dealing with physiology, pathology and hygiene, the third and fourth with the treatment of disease and the fifth with the composition and preparation of remedies.

Avicenna was a close follower of Hippocrates or rather of the "*Corpus Hippocraticum*" which includes many writers. We know little of the individual Hippocrates, of that personality that Aristotle called the "great Hippocrates," but the medico-philosophical cycle that was formed, can be called Hippocrates in the generic sense. In fact Avicenna constitutes, and therein lies his great claim for fame, an important link between the Hippocratic collection and the mediaeval universities of Europe and even with modern medical science as the great principles and methods of medicine are observation and reasoning, the same today as when expounded by Hippocrates and his disciples.

Nevertheless Avicenna's works show an advance in some things and not a slavish acceptance of Hippocratic principles. It is interesting to note that his idea of medical ethics were an improvement upon those of the great Grecian School. Hippocrates, in reply to the criticism that many patients die and that the art of medicine is therefore faulty, those who recover owing their deliverance rather to Fortune than Art, said:

Medicine although an Art is not infallible and not omnipotent; it cannot go beyond Nature, it cannot repair the irreparable, it cannot perform miracles. Medicine therefore rightly refuses to undertake the treatment of incurable diseases, but it is the nature of things and not medicine that is to blame.

Four hundred years later Celsus wrote:

Now the principle objects that are to be obtained by the physician is to know what cases are incurable, what are difficult and what more easy, for it is the duty of a prudent man not to undertake a case that he cannot cure, nor to subject himself to the imputation of having destroyed a patient who was destined to die of his disease.

Still two hundred years later Galen gave similar advice. Avicenna, however, struck a loftier note, more in consonance with modern sentiment. He taught:

We should bear in mind the infinite resources of Nature and we should never seem to abandon a patient, although we really cannot do anything efficaciously. Up to the last moment we should endeavour to soothe, but we must not gamble with a life by powerful remedies or big operations where there is no well-founded hope, otherwise we render ourselves voluntary homicides.

Avicenna's fame as a philosopher was much inferior to that as a physician, none the less he occupies a position of eminence among Moslem philosophers. Shahrastani, a great Mohammedan commentator, takes him as the type of all and Algazali's attack on philosophy in general is really an attack on Avicenna in particular. Avicenna's system of philosophy is a codification of Aristotle, modified by fundamental views of neo-Platonistic origin and is a compromise with theology. In order, for example, to maintain the necessity for creation he taught that all things except God were admissible or possible in their own nature, but that certain of them were rendered necessary by the act of the creative first agent, in other words, that the possible could be transformed into the necessary.

Avicenna's theory of the process of knowledge is an interesting and picturesque part of his doctrine. The stages of the process of the acquisition of knowledge are enumerated by him as follows:

1. The stage of material or potential intellect likened to the dormant power of a child for writing before he has put pen to paper.
2. The second stage called "*in habitu*" compared to a child that had learnt the elements of writing, the bare possibility being on the way to be developed and seen to be real.
3. The power of writing being actualized, there is a parallel to "*intellectus in actu*" and the way of science and demonstration is entered.
4. When writing is a lasting and facile accomplishment to be taken up at will it corresponds to the "*intellectus adeptus*," the complete mastery of science.

My reference to various authorities on the life and times of Avicenna have impressed me with the extraordinary vitality of Hellenic culture in the Eastern world. In spite of centuries of desolating warfare, numerous invasions, frequent changes of language and religion, the philosophy and culture of Greece survived.

Aristotle, the philosopher *par excellence*, just as Mohammed was the prophet, was revered and studied in the Mohammedan lands from Central Asia to the Atlantic, was probably better understood in Balkh or Samarkand in the ninth century than anywhere in Europe. The suggestions got from Greek books of the different sciences, mathematics, astronomy, geography, zoology, botany, chemistry, grammar, logic, which had been translated into Syriac under the Christian Roman Empire and into Arabic under the Mohammedan Caliphate, gave rise to an Arabic scientific literature much more advanced than anything produced in the West at that time.

This literature was mainly produced, not by men of Arabic stock, but by the Arabic speaking Syrian

or Persian descendants of the old people of the land. Although the reigning dynasties might be Arab and although the new religion spreading over these lands might be of Arabian origin, the Greek scientific interest did not perish, but was transfused into a new medium. As late as the eleventh century *anno Domini*, Avicenna prosecuted his studies in Bokhara and at Khiva Biruni was making researches into the specific weight of metals.

In the ninth and tenth centuries the Mohammedan east which had the start of the Christian west had made an advance in rationalistic science which the west did not overtake until the *Renaissance*.

The sixth century before Christ is one of the great epochs of history; it demarks the end of the thousands of years old worlds of Babylon and Egypt whose primitive culture dominated all dynastic changes, and the beginning of the dominion of the new powers. In western Asia the Aryan or Indo-European is to supersede the Semite, in China Confucius appeared, in India Buddha and in Europe the Hellenic genius stands out as a distinct and powerful entity. At this time along the western seaboard of Asia Minor numerous separate self-governing cities were founded. They were not regarded seriously by the Eastern peoples who thought of them only as the Yavana and the best fighting mercenary soldiery available. The reigning Pharaohs, of Egypt, relied upon them and Nebuchadnezzar himself employed them.

By this means, even at so early a date, the migration and penetration of the Greek with his potential preeminence of intellect had begun throughout western Asia. This was the time of the great Persian Empire under Cyrus and Darius, an empire that extended from the Balkan mountains to the Indus and included Bokhara, Merv, Transcaspia, Afghanistan and Beluchistan, the greatest aggregation of power the world has ever yet seen.

On the extreme west the Persian Empire was in contact with the Greek colonies of the coast of Asia Minor. This caused endless trouble; the city states demanded freedom of government and sovereign rights. There was incessant rebellion against the Persian overlord and eventually with the help of the Maritime League, lead by Athens, these seaboard colonies established their independence and the Persian kings abandoned their attempts to conquer European Hellenes after the ill-starred expeditions of Darius and Xerxes.

In these turbulent and rebellious cities a great change was taking place, new trains of thought were starting, the minds of men were being emancipated from tradition and custom to apply a new method of rational criticism and that which we call western civilization, with its command over material nature, is but the fruition of the seed that was being sown in the western fringe of Asia during the fifth and sixth centuries before Christ. During the third century before Christ the tables were amazingly and completely turned and the whole Achaemenian Empire was subject to a Greek king, the Great

Alexander. The untimely death of Alexander caused a long and bitter struggle to rage chaotically between Alexander's Macedonian marshals and from this emerged the Asiatic dominions won by Seleucis. During the next three hundred years this Seleucid Empire was to break up and decay. The outcome of this partition of Alexander's dominions was more firmly to plant Grecian standards of life, thought and art throughout western Asia. Marshals, governors and garrisons sent by Alexander to hold his possessions, ceased to be temporary residents and became permanent colonists. Cities, purely Grecian in architecture, government and language, were founded and in the last two hundred years before Christ the road from Seleucia to Media passed through city after city with populations in part Greek with Greek as the official language, Greek schools, gymnasiums and theatres.

There is in existence a decree, dated 206 B.C., of the city of Antioch in south-western Persia which shews the ordinary political machinery of a Greek city. It is an interesting comparison with British colonization. Seleucis, the Greek soldier and emigrant, founded Seleucia and grafted Grecian ideas on to the native life just as the British emigrant to South Australia founded Angaston or Reynella and implanted British laws, religion, language, science and pastimes on the native soil of that State.

During the last century before Christ and the first two of the Christian era, the Seleucid kingdom disappeared, squeezed between Parthia and Rome who continued to dispute the sovereignty of the Asiatic domain. In the third century *anno Domini* the Sasanian Persian dynasty with its founder Artaxerxes arose to dispute with Rome the control of the countries that concern us and for seventy years contest after contest raged. The mantle of the great Alexander eventually fell upon Rome and under her dominion, especially that of Christian Rome, the Greek cities of western Asia reached their zenith.

In the seventh century the Sasanian dynasty under Chosran the Second made a successful attack on the Roman Empire and the Persian armies swept over Asia Minor to the Bosphorus; this brief and meteoric revival of Persia's greatness was its final extension before its complete doom. The Emperor Heraclius, by strategy closely resembling that of General Allenby in Palestine, drove the Persians out of Asia Minor.

At this date a new power arose, Islam. It came from Arabia and after years of inferiority a Semitic people came to conquest more extensive than that of Persia, Greece or Rome, gaining much of its strength from its new monotheistic creed.

A great part of the earth which Alexander had won for Hellenism and Constantine for Christ now passed under the new Semitic power. To the Christian element the new power was not as alien as Zoroastrian Persia had been, for the religion of Islam also had its roots in Judaism. After its conquests it revered Moses as a prophet and the Christ God Manifest was honoured as a prophet all over Iran. But for Aristotle the first followers of the prophet had no use, the Hellenistic element they trampled under foot. These elements although smothered temporarily were not killed and gradually they leavened

the primitive peoples thrown upon them. In the Western world the Goth, Vandal, Frank and Saxon had no use for the classical civilization they submerged, but from the smouldering ruins they made sprang the great Western civilization of today. So in Asia the outfought and outnumbered old peoples of these lands, Syrian and Persian, accepted Islam, learnt Arabic, but retained their interest in Hellenistic culture and did new original work on Grecian lines.

This very hurried, incomplete and indifferent survey of the vicissitudes of the lands that Avicenna traversed will, I hope, show why we may fairly regard the Arabian physician and his school as a link between the east and the west. The eastern survival of Grecian intelligentsia has gone, swept away by Mongol and Turk, who by a process of extermination left the land bereft of a population sufficient to maintain it and reduced the survivors to a nomadic existence without either time, opportunity or inclination for intellectual pursuits. Avicenna stands out as a disciple of the doctrine for which the British people fought a great war, the right to live in health and freedom. His character can be summed up in the words of Hippocrates himself, who said that the attributes of the ideal physician were:

"ἥν γὰρ παρῇ φιλανθρωπία, πάρεστι καὶ φιλοτεχνία."

#### Acknowledgement.

The author wishes to acknowledge his indebtedness to the *Encyclopædia Britannica* and a book by Edwyn Bevan entitled "The Land of Two Rivers," from both of which he has quoted freely and sometimes *verbatim*.

#### NOTES ON DIATHERMY.

By W. KENT HUGHES, M.B. (London), M.R.C.S. (England),  
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Carlton.

#### Diathermy and Tonsils.

THE use of diathermy in removing tonsils is receiving such an extended trial that I wish to record my experience both as regards benefit to the patient and satisfaction to the surgeon. Being impatient at the time taken by the monopolar method, I tried half a dozen cases with the endotherm knife. Though there was decidedly less after pain than following after ordinary enucleation, its advantages were not so great as to induce me to proceed further in this direction. The one objection to monopolar necrosis is the time taken to remove completely the whole of the tonsil. On the other hand if any be left, peritonsillitis is not so likely to occur as there are no adhesions caused. It is really a case of "repairs while you wait." A business man can come for treatment during his lunch hour and go straight back to his office. During the past six months not one patient has missed a meal during treatment. The danger of destroying too much tissue is not only not to be considered, but it is rather a question of not destroying enough. By burying the needle in the tonsil tissue a greater effect can be produced than by using the spark only. The first difficulty to be overcome is "the unruly member" and the tongue is more often a bother

in men than women. I have had a spatula made of vulcanite after the pattern of Lack's spatula. This carries the wire and the needle protrudes from the end at an angle, necessitating a right and a left instrument. Another vulcanite spatula is needed to evert the tonsil by pulling outwards the anterior pillar and pressing the tonsil out of its bed. It is very easy to remove some tonsils by this method completely and it is quite difficult to remove them in other cases. In the latter quite as much knack and manipulative skill are called for as in enucleation by the ordinary method. Some discredit has been brought upon this method by the careless and inefficient manner in which it has been done. It is the operator and not the method that is at fault.

In many patients it is quite easy to destroy adenoids by lifting up the soft palate and sparking on to the mass. Keratosis, warts and corns can also be removed by sparking without any local anaesthesia, only care must be taken not to spark twice on the same spot.

#### Diathermy and Deafness.

With added experience of diathermy I would like to give a few hints that may be useful to beginners. Do not overdo the treatment either by giving too long or too many sessions. Ten minutes to each side for twelve days (Sundays omitted) is what the average patient will respond to best, then three times a week for a fortnight and twice a week for another fortnight.

A few especially the older patients will require a longer course. Stop treatment when improvement ceases and begin again after a short spell for a week or so. Watch your patient carefully; if improvement ceases or if a retrograde movement sets in, stop treatment for a week.

In several instances after a preliminary improvement I have noted a sudden recession; further treatment does not show improvement, but a complete rest for a week or a fortnight brings about the desired effect. In some after a fortnight's treatment, I have found an increased susceptibility to catarrh. Rest and a less vigorous course on resumption have enabled me to avoid recurrence. This susceptibility is more common in the younger patients. I still find that more improvement is obtained in the older patients (over sixty) and they still continue to express a feeling of well being that is an additional advantage to be gained from the treatment.

I have had two patients with episcleritis under treatment; one did exceedingly well, the other is only a partial success. Both of them had septic tonsils and the treatment of that condition may account for most of the success in the first patient and the condition of the teeth may account for the less satisfactory result in the second. The removal of the teeth was delayed at the urgent request of the patient. Later after removal of teeth the condition cleared up completely. Non-suppurative sinus conditions continue to respond well especially in children.



### The Diathermy Knife.

The more I use Wyeth's knife, the more convinced I am of its efficacy and wide sphere of usefulness.

Case No. 1.—Some five years ago I removed a small rodent near the ala of the right nostril of a man aged sixty-five years and when I saw him last three years and a half ago, there was no sign of recurrence. Now he has a very extensive involvement of the antrum and right alveolar border and the adjacent mucosa of the cheek and palate. A large portion of the face and the right side of the nose and anterior wall of the antrum were destroyed leaving a large hiatus. I removed the whole of the superior maxilla making a similar incision to the ordinary operation, leaving a small portion of the soft palate on the right side. The bone was cut through with forceps after incision by knife, both in the case of the hard palate and of the malar process. The incised lip was sutured and healed well.

The two chief points of interest were: (i) the complete absence of shock and (ii) the negligible amount of discharge. The only discharge that did exist was caused by the presence of food; if it had been a case wherein it would have been possible to have left the mucosa of the hard palate, I believe that discharges would have been absent. During the whole operation I applied only four pairs of forceps and coagulated the vessels involved. No vessels were tied.

Case No. 2.—An epithelioma about 3.0 by 2.5 centimetres from the right vulva was removed from a patient of sixty. A very wide sweep was made leaving a circular gap of about seven and a half centimetres in diameter. Only three vessels were picked up with forceps and coagulated. There was no apparent involvement of the glands.

Case No. 3.—For a recurring rodent involving the tissues in front of and behind the left ear in a man of fifty-eight, a wide sweep was taken about seven and a half centimetres by ten centimetres in extent. Only four vessels required picking up with forceps. For a day he had a transitory paralysis of the muscles supplied by the facial nerve. Previously the superior branch had been damaged by coagulation necrosis of the original growth just above the parotid region.

Small growths can easily be removed with a local anæsthetic.

The one disadvantage is that in order to obtain the best results and insure primary union, speed in incising is necessary. When I first used it eighteen months ago, I was a little in awe of the knife and feared I might do some damage, but my fears were groundless and my only regret is that I did not have the instrument during the days of my youth. I can quite credit all that Wyeth writes about its use and possibilities.

On further trial I am not so enthusiastic about reduction of blood pressure. It seems to confer a temporary benefit only.

## Reports of Cases.

### TORSION OF THE GREAT OMENTUM.

By M. P. SUSMAN, M.B., Ch.M. (Sydney), F.R.C.S. (England),

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#### Case Record.

H.H., A MALE, aged fifty-nine, had been suffering for a fortnight from flatulence and mild abdominal pain starting about ten minutes after food. Two days before his admis-

sion to hospital there had been a sudden increase in the severity of the pain which was confined to the right iliac and lumbar regions. He had no vomiting or nausea and the bowels continued to act.

He was moderately stout; his general condition was good. His temperature was 37.8° C. (100° F.) and his pulse rate 86 per minute. The tongue was furred. There was tenderness and rigidity of the whole of the right side of the abdomen, with impaired resonance to percussion; no tumour could be felt. Rectal examination revealed no abnormality and the remaining systems were clear.

The provisional diagnosis was acute appendicitis.

#### Operation.

I opened the abdomen through a right paramedian incision. Some bloody fluid at once escaped. The extreme right portion of the omentum was found to be axially rotated on itself several times. The swollen and congested piece beyond the twist was resected; no other abnormality was found. The patient had an uneventful convalescence.

#### Classification.

Three varieties are described by Lejars:<sup>(1)</sup> (i) Omental torsion combined with an irreducible hernia, usually a right inguinal one; (ii) omental torsion combined with an empty hernial sac; (iii) omental torsion without any hernia, as in the case here reported.

Cowell's classification<sup>(2)</sup> is:

1. Abdominal. (a) primary: there is no apparent cause; (b) secondary: there is associated disease of some abdominal or pelvic organ.

2. Hernial. (a) Intraabdominal, (b) intraabdominal, (c) combined.

#### Frequency.

The abdominal type is the rarest, that is, there is no hernial sac. Cowell traced only fifteen cases of the primary abdominal variety and three of the secondary abdominal type, but one hundred and forty cases associated with hernia.

#### Pathology.

The whole of the omentum may be involved, as in Foster's case, but usually it is only the right extremity that is twisted. Adhesions, if present, are characteristically light; adhesion is usually to the anterior abdominal wall, accounting for the dullness to percussion noted in my case and others. The pedicle may rupture and the mass become adherent secondarily to one of the abdominal organs.

#### Ætiology.

1. Sex. The condition is commoner in males than in females.

2. Age. In Cowell's series the youngest patient was fourteen and the eldest fifty-five. My patient was aged fifty-nine and Reid's was sixty-five.

3. Obesity. Obesity is usually present; it is mentioned as excessive in three of Cowell's series of eighteen. One of MacAuley's patients is described as small and slim.<sup>(3)</sup>

4. Associated inflammatory disease. Three of Cowell's eighteen patients had intraabdominal inflammation. In Foster's case<sup>(4)</sup> the appendix, swollen and inflamed, was held to be the cause. Such cases constitute the secondary abdominal torsion in Cowell's classification.

#### Symptomatology.

Premonitory symptoms are unusual, but were present in my case and in Reid's.<sup>(5)</sup> Generally pain is the first complaint; it is of sudden onset, but not severe as a rule and is localized to the right side of the abdomen. Vomiting is variable. The bowels usually continue to act normally. Mild fever is present. Rigidity and tenderness are found on the right side, especially in the lumbar and iliac regions. Generally an indefinite tumour is palpable, with impaired resonance over it.

At operation free blood-stained fluid is found in the peritoneal cavity in almost every instance. Sometimes there is œdema of the parietal peritoneum.

#### Diagnosis.

The condition has rarely been recognized before operation. Sometimes the diagnosis is gall bladder disease or

intestinal obstruction, but in the great majority of cases it is acute or subacute appendicitis. The chief points in the differential diagnosis from appendicitis are: (i) The early pain in appendicitis is usually umbilical, but in torsion of the omentum it is confined to the right side from the start. (ii) Nausea and vomiting are infrequent in torsion of the omentum. (iii) A tumour, if present with appendicitis, develops slowly, but with torsion of the omentum it develops suddenly.

#### Treatment.

The twisted portion of omentum should be removed. Operation must be immediate lest gangrene of it ensue. One should look for possible causes such as a hernia or an inflamed organ. The prognosis is good.

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### TUMOUR OF THE BRAIN: SPONGIOBLASTOMA MULTIFORME.<sup>1</sup>

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AND

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#### CLINICAL HISTORY.

(GEORGE BELL.)

R.S., AGED about twenty-two years, single, was admitted to Sydney Hospital on July 19, 1927, with a fourteen months history of fits. Dr. Andrew Davidson and Dr. W. R. Page who advised admission, diagnosed the case as being one of Jacksonian epilepsy due to tumour of the left motor cortex and advised operation. In these fits the right foot and then the leg began to move, then the right

arm and this was followed by loss of consciousness. The patient did not bite his tongue nor pass urine during the fit. The right leg gradually became weaker and the right arm also. There was a sensation of pins and needles in the right leg only. There were neither headaches nor vomiting. The eyesight was quite good. The patient had had no previous illnesses.

On physical examination *fibrosus molluscum* nodules were found on the trunk. The right leg was paretic. No wasting was evident.

The patient walked with difficulty and at times had to be supported by an attendant, the disability being caused mainly by the disturbance of muscular function in the right leg.

The pupils were equal and reacted to light and accommodation. The right knee jerk was exaggerated. The plantar reflex was extensor on the right side and flexor on the left. Patellar clonus was present on the right and absent on the left side. No ankle clonus was present. No sensory disturbance was discovered. The other limbs were normal. Nothing abnormal was detected in any of the other systems. The Wassermann reaction was negative on three different occasions. The blood count was normal. On cytological examination of the cerebro-spinal fluid two cells were found per cubic millimetre. The complement deviation, precipitin and Casoni tests for hydatid disease were negative.

An X ray examination was made on July 21, 1927. The skull and cranial cavity were examined. There was no evidence of injury, but it was reported that the cranial bones were abnormally thin.

Treatment was started by the administration of a saturated solution of potassium iodide in increasing daily doses. The patient left hospital walking and relieved on September 5, 1927.

He was admitted again on October 10, 1927, still suffering from the same variety of fits. His memory was quite unimpaired. He improved definitely under a course of rest and iodides and was discharged relieved on November 7, 1927, with a potassium iodide mixture. He was admitted again on December 8, 1927. The fits were now becoming worse and after consultation operation was decided upon.

Operation was performed on December 14, 1927. An osteoplastic flap was reflected over the motor area on the left side. The pia-arachnoid over a slight bulge in the brain in the upper motor area was covered with small tubercles, one to several millimetres in diameter.

On cutting into the superficial cortex a gelatinous tumour was exposed and shelled out, a smooth walled cavity about 3.1 centimetres (one and a quarter inches) in diameter and three millimetres (one-eighth of an inch) below the surface of the anterior central gyrus (leg area) being left. The consistency of the tumour was that of an imperfectly set jelly. At the end of the operation, as the patient was suffering from shock and hæmorrhage, a blood transfusion (Kimpton tube) was done.

The patient was discharged on February 1, 1928.

#### Post Scriptum.

On November 27, 1928, the patient reported that he had been well, except for slight headaches at times. No fits have occurred since the operation and no vomiting. On examination the right knee jerk is exaggerated and Babinski's sign is still present on the right side. He walks well, but with a slight limp due mainly to slight spasticity of the muscles of the right calf.

#### Acknowledgement.

I am indebted to my house surgeon, Dr. G. T. H. Bohrsmann, for his care of the patient and his assistance with these notes.

#### PATHOLOGICAL REPORT.

(OLIVER LATHAM.)

Some unusual and interesting features having been noted by Dr. Keith Inglis in a small mass of tissue removed at operation from the brain of a young man by Dr. George Bell, the rest of the tissue in 10% formalin solution was handed to us for further study. A request was also made for any evidence which might be found connecting the mass with the condition of neurofibromatosis or von Recklinghausen's disease from which the patient suffered. We are indebted to Mr. H. D. Wise, Neurological Technician to the Anatomy Department for the two silver preparations.

<sup>1</sup> The patient described herein was shown at a meeting of the New South Wales Branch of the British Medical Association on July 12, 1928.

### Primary Examination of the Tissue.

Paraffin sections stained by hematoxylin and eosin revealed a cellular tumour whose chief features were clumps of very long cells more or less arranged in parallel and whose ends commonly faded away into a half fibrous, half granular matrix or intercellular structure. Sometimes a tumour cell contained one nucleus in the centre and sometimes the cells were multinucleated. The most typical cell was a bipolar fibre thicker in the middle where the nucleus stretched the cell. Some cells seemed excessively thick, but these cells were hyaline and several were probably fused. The longer cells quite spaced the breadth of the field when examined by an eight millimetre (one-third inch) lens and  $\times 10$  eyepiece and often exhibited a corkscrew shape like the processes of neurones when developing or degenerating. When examined in cross section to the major axis, cells and nuclei of many and bizarre shapes and sizes were noted, including the well known horseshoe shape. No neuroglial fibres were seen.

Now brain tumours histologically similar to this one have previously been examined by us and classed as "long" celled or "giant" celled gliomas.

### Nissl's Method of Staining.

The routine Nissl-methylene blue method of staining nerve tissue demands primary fixation in alcohol alone. By this means and by careful differentiation or decolorization scarcely anything remains stained save the Nissl or tigloid bodies in the nerve cells and various nuclei. Naturally neuroglia cells of any kind, having no tigloid bodies, would show only their nuclei stained, while neurones which had reached a stage containing tigloid bodies, would show up readily. Our tumour having been preserved in formalin, precluded this method of examination.

At our laboratory we have long since used a modified Nissl technique wherein the tissue is first fixed in 10% formalin in 1% saline solution before the alcohol, which gives a panoptic picture including quite a large portion of the neurone, some glia cells and their fibres, blood vessels and various migrating cells and endothelium as well as the tigloid bodies and all this from a pathological point of view is most useful, since these structures are prominent in

encephalitis and some gliomas. This method, however, applied to our sections still revealed no glia fibres and although no Nissl bodies could be made out, the general shape of the cells so resembled neurones that we were quite in doubt whether the tumour was a glioma or neuroma. Other methods of staining had to be resorted to.

### The Histogenesis of the Brain.

To understand properly the classification of the gliomata and why at certain stages of development a glia cell should resemble a neurone, some reference is essential to the development of the central nervous system. A good deal of work has recently been done in various countries in this field, especially since the newer metallic impregnation methods of Bielchowski, Del Hortega, de Fano, Achucarro, Ziehen and Robertson have been available and more systematic use been made of the older Golgi and Cajal methods. Much of this work has been gathered together by Bailey and Cushing in America and by Carmichael among others in Britain. I shall borrow freely from their work and illustrations in the main undertaken by them to aid in the classification and prognosis of a series of intracranial tumours.

A commonly accepted view is that when the medullary plate becomes the neural tube, two main types of cells may be recognized there: the primitive spongioblast (S.1) and the germ cell (G.1). Those spongioblasts collecting near the centre of the tube become the ependymal spongioblasts (S.E.2) and eventually the adult ependyma and on occasion may develop tumours of their own, the cellular picture depending upon what stage of development the ependyma type of cells that compose the tumour, has reached.

The remaining spongioblasts (somewhat pressed into an elongated form by the

developing germ or germinal cells) now pass through the various stages of apolar (S.2), unipolar (S.3), bipolar (S.4) spongioblast.

Bailey and Cushing would like to substitute the term unipolar and bipolar glioblast because having now definitely taken up a single line of development they are unipotential, will only develop neuroglial cells. They would retain the term spongioblast for the relatively undifferentiated primitive and apolar spongioblasts, some of which appear to have the power of

### LEGENDS TO ILLUSTRATIONS OF DR. LATHAM'S REPORT.

Zeiss apochromatic four millimetre lens and Zeiss compensating eyepiece  $\times 12$  have been used for the preparation of the drawings.

#### FIGURE I.

Formol fixation and phosphotungstic haematoxylin stain which scarcely stains the indefinite intercellular fibrils and allows most of the cells to be made out, have been used. It is obvious that the chief feature is groups of bipolar cells whose tails corkscrew and intertwine with each other. Cross sections of these whorls reveal multinucleated masses and are closely apposed to the thin walled blood vessels one of which is depicted with representation of the indefinite intercellular fibrous matrix. Some cells averaged over  $340 \mu$  long.

#### FIGURE II.

Haematoxylin and eosin have been used. The stain shows up the nuclei better, but as it also stains the intercellular matrix, most of the "tails" lose themselves in it. Note the horseshoe form. Some tumours show this much more. These stains reveal more tumour cells than the metallic ones.

#### FIGURE III.

Section is stained by Cajal's silver stain for neuroglia fibres. That the silver effectively impregnated is shown by the deep black staining of the elastic fibres accompanying the blood vessels. Note one passing down from III. The cells only take on a slightly deeper purple than the ground substance; nevertheless, many cells show glial fibres. The more typical tumour cells do not show lateral processes. This "reaction neuroglial" boundary zone is characteristic of this group of tumours. No sucker feet were noted and fibres are rare in these tumours.

#### FIGURE IV.

Cajal's silver unmyelinated fibre stain has been used. Note the innumerable black axones at bottom which white substance is being invaded by the tumour cells. No connexion can be made out between any black fibre and tumour cell and the latter, not taking the silver impregnation, cannot be neurones.

Figures V to X are from book illustrations.

#### FIGURE V.

This represents apolar, bipolar and unipolar developing neurones stained "black," by silver. Note the likeness to

#### FIGURE VI.

This shows developing bipolar spongioblasts; they owe their blackness to gold sublimate. They do not take silver.

#### FIGURE VII.

This shows unipolar spongioblasts. Gold sublimate stain has been used.

#### FIGURE VIII.

This shows cells from a *spongioblastoma multiforme* tumour. Gold sublimate has been used.

#### FIGURE IX.

This is a cross section whorl of cells from *spongioblastoma unipolare*  $\times 850$ , phosphotungstic acid-haematoxylin. Tangled mass of unipolar spongioblasts. Note resemblance to acoustic neuroma.

#### FIGURE X.

This shows bipolar and bizarre shaped cells from a *spongioblastoma multiforme* tumour. Gold sublimate stain has been used.

#### FIGURE XI.

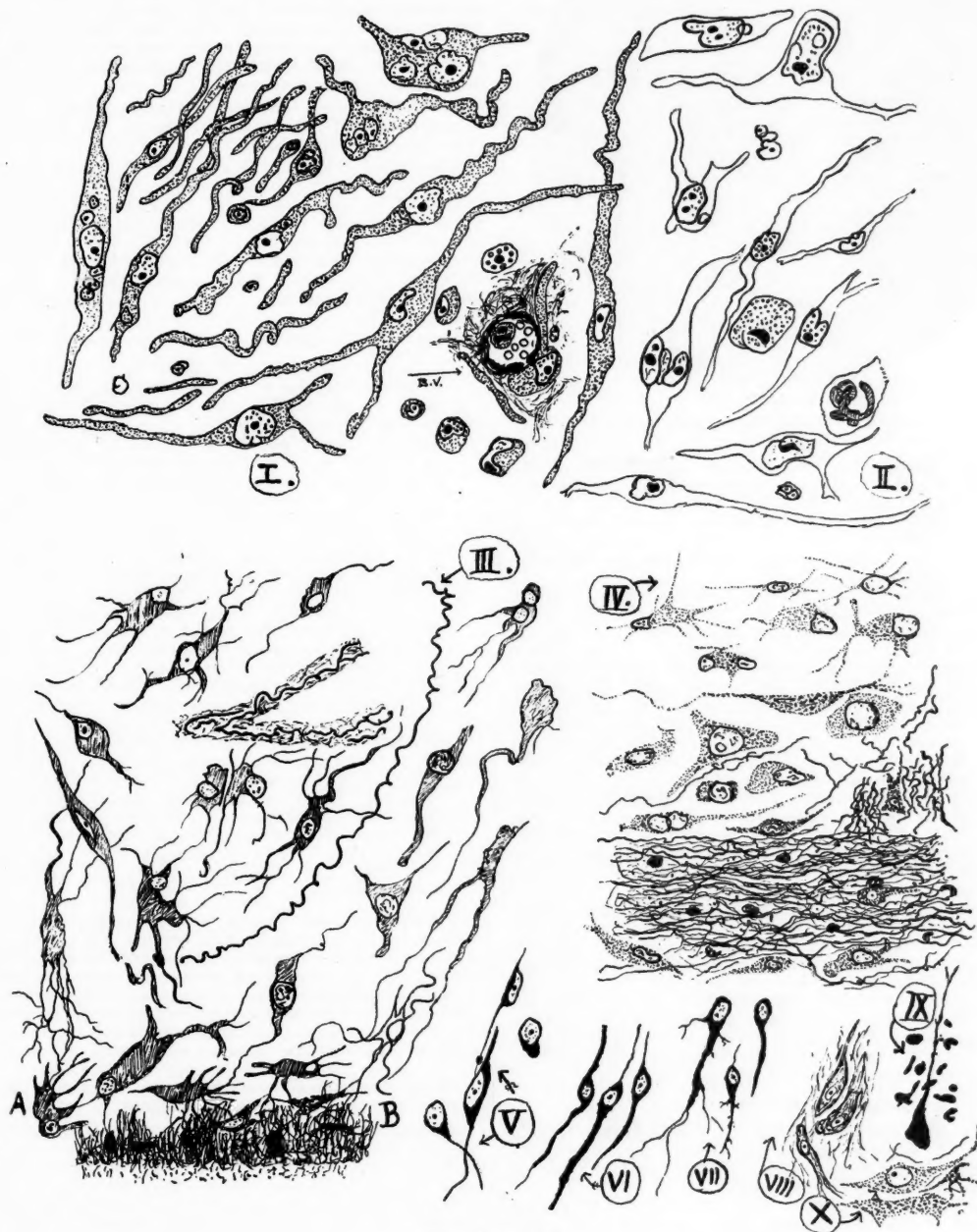
Photomicrograph of bipolar cells drawn in Figure I.



developing into ependyma *et cetera* as well, that is, are bipotential.

The bipolar spongioblast (glioblast) eventually becomes an astroblast (S.5) and has an affinity for gold in the sublimate process and possesses a sucker foot to be attached to blood vessels. The still immature astroblast

of development. But such "pure" tumours are rare and as a rule other stages in development may be recognized in some of the cells composing a tumour and also the tumour cell at whatever its stage scarcely comes up to the corresponding cell in normal tissue. On this account great difficulty may be met with in classifying many cells



Figures I to X.

may become (a) fibrillary astrocytes (S.6a) or (b) on the other hand, protoplasmic astrocytes (S.6b). Special stains bring out these processes. It remains to be added that theoretically we may have tumours of the glioma series whose cells correspond to any one of these stages

found in these tumours. In some composed of very primitive cells help may be obtained by recognizing some higher forms which have been developed. Sometimes successive portions removed at subsequent operations show a progressive downward grade of development. The tumour we are



Figure XI.

Photomicrograph of bipolar cells drawn in Figure I.

examining belongs to the bipolar spongioblast stage and because of certain peculiarities in the shapes and sizes of the cells and nuclei is further called a *glioblastoma multiforme* to which group probably belong a third of the gliomata. Hitherto it was only upon the glial processes of the fibrillary astrocytomata that the diagnosis of glioma was made at all.

Having disposed of the "glioma" series, one may allude to the further development of the "germ" cells. The germ (G.1) cell gives rise to two types of cell, the apolar neuroblast (G.2A.) and the medulloblast (G.2M.). The former passes through a bipolar stage (G.3) and then a unipolar (G.4) stage and eventually becomes the adult neurone or nerve cell (G.5). Their protoplasm has an affinity for reduced silver. The medulloblasts (G.M.2) retain the staining properties of the germ cell and possess no affinities for gold or silver impregnations. Many brain tumours are composed of medulloblasts which have an interest for us because some of their cells seem bipotential; at least many of the cells can develop into neurones staining both by Nissl and silver as well as into spongioblasts. However, when they spread down the cord, only the more primitive cells proliferate and the tumour histologically resembles a sarcoma.

Some maintain that the oligodendroglia cells are derived from the medulloblasts. They were included among the so-called "indifferent" or "primitive" cells, but modern impregnation methods have revealed this cell as highly differentiated and with distinctive processes.

Thus it may be realized how staining helps to differentiate these tumours. Sometimes the presence of a centrosome at the base of a process reveals the spongioblast. A similar series of tumours may develop from other sections of the neural crest, namely pinealomata.

#### Results of Special Staining.

Some of the sections stained by phospho-tungstic acid hæmatoxylin scarcely stained the indefinite intercellular tissue and allowed a clearer view of the individual tumour cells. No centrosomes were noted.

When Cajal's ammoniated silver stain for glia fibres was used, most of the tumour cells were inconspicuous, while others, taking on a deeper purple than the rest of the section, could be made out. The stain revealed a definite border to the tumour where numerous abnormal glia cells with abnormal processes arranged themselves with their long axis parallel to this border and mixed with innumerable fibres made up a felt-work, strengthened here and there by reinforcements. By another method still finer fibres could be seen outside this which also stained

differently by Van Gieson's stain. This false border is of interest because the *glioblastoma multiforme* often shells out easily; but these tumours infiltrate widely and were the gliosarcomata of the early writers. That the "silver" impregnation "took" is evidenced by the jet black appearance of the elastic fibres accompanying the blood vessels. One such fibre passes down from Mark III in Figure III, the accompanying blood vessel not having stained well. The tumour cells scarcely show any fine fibres, but I cannot definitely indicate where the more glia-like cells cease and the tumour-like cells predominate, save that the former prefer the border zone.

By Cajal's silver method for unmyelinated fibres in formalin tissues the regular axons in the white matter were readily stained black.

Many other scattered fibres similarly impregnated were noted and numerous tumour cells were seen invading this tissue, as well as cells more like glia cells with definite fibres. In no case could any connexion be found between any of these cells and one of the silver impregnated fibres. The tumour cells were not stained black, but simply indicated by a sort of dusty deposit, thus revealing that they were not neurones.

#### Special Description of the Glioblastoma Multiforme.

The *glioblastoma multiforme* is a rapidly growing malignant tumour of such multiforme aspect that the term "glioma multiforme" is eminently suitable. It is very prone to degenerative changes which introduce the most varied pseudo architecture. The nuclei vary in size and shape and amount of chromatin and many cells have many nuclei representing true neoplastic giant cells. The multiformity of the cell is strikingly brought out by the Cajal gold sublimate method by which they are seen to exhibit shapes round, elongated, pear-shaped and spindle . . . even imperfectly formed star-shaped astrocytes being found. A perithelial aspect may be given by only those cells around a vessel surviving. This latter arrangement must not be confused with that caused by collections of unipolar spongioblasts sometimes encountered in these tumours. The vascular sinuses are usually thin walled and degenerated, but sometimes show outgrowths of adventitia which may intermingle with the tumour cells. Hyaline transformation of the giant cells leading to fusion of adjacent cells gives a false impression of size. Degeneration causes the cysts so common in most brain tumours. These tumours are diffusely invasive. They do not form metastases and rarely inoculate the leptomeninges like the medulloblastomas, but more than other gliomas have been known to invade the extracranial tissues after decompression operations and even travel down the patient's neck like a sarcoma.

Prominent blood vessels are commonly a feature of tumours of neural origin, both central and peripheral, and at times seem to suggest a resemblance to the endotheliomata. On the other hand, congenital nævoid growths by a degradation process, not uncommon in gliomata too (as evidenced by the histological examination of successive operative procedures) sometimes form the origin of highly cellular and invasive tumours in nervous tissue.

#### Possible Connexion of the Brain Tumour with the Cutaneous Nodules.

Although the existence of a form of von Recklinghausen's disease in which the nerves are said not to have been involved, has been described, some doubt exists as to whether all the tumour masses were subjected to the most thorough histological preparation. Bielchowski and Rose go into this and tell us: "Central changes in this disease include (i) developmental anomalies and (ii) overproduction of cell-elements of glial origin . . . the latter taking the form of blastoma formations, either as neuro-epithelial tumours or as neuromata." Nevertheless, whether we are dealing with the classic form of neuro-fibromatosis with the punctiform pigment spots, *café-au-lait* patches, fibrous nodules on nerves and fibrous tumours on eyelid or lip or those tumours in which the cutaneous nerves

simply reveal a generalized thickening due to interstitial (neuronic) overgrowth and finally those multiple neuromata of myelinated nerves (and all of these can be associated with central tumours, intracordal or cranial), yet all must be considered as of neuronal origin. This brain tumour has been adjudged spongioblastic and this would seem to negative any connexion between the two lesions. Nevertheless, Bailey and Cushing, on page 139, write of the unipolar spongioblastomas:

Their average survival period of nearly four years is at variance with what one would expect from their histogenesis. Some of the tumours show a variable number of bipolar spongioblasts and it is possible that the cells represent a differentiation in the direction of the cells comprising the neurilemmal sheaths. From this viewpoint they may perhaps be allied to the peripheral neurinomas, it having been shown by Kuntz and later by Harrison that a certain number of medulloblasts wander out on to the nerve fibres to be transformed into the sheath of Schwann.

And again, speaking of the bipolar spongioblastomas:

The whole structure . . . more nearly resembles that of an acoustic neurinoma, the cells of which are also of ectodermal origin.

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#### TRAUMATIC HÆMOPERICARDIUM.

By DAVID ZACHARIN, M.B., B.S. (Melbourne),  
 Registrar, Saint Vincent's Hospital, Melbourne.

THE patient, a male, about seventy years of age, was admitted to hospital on September 25, 1928. He was a widower, a caretaker at a Melbourne public school, and for the past two years had been unable to carry out any heavy work.

Two weeks before admission he became much worse and complained of pain and precordial tenderness. The pain radiated to the left shoulder. Dyspnoea was a prominent feature. The pain was persistent and aggravated by exertion. There was no œdema of the legs. Otherwise he had no complaints beyond a slight irritant cough and anorexia.

Examination revealed emphysematous lungs and a heart with the apex beat in the fifth left intercostal space, 10.6 centimetres (four and a quarter inches) from the mid-sternal line, and no extension of right cardiac dullness. Cardiac sounds were feeble and the rhythm manifested an irregular irregularity.

The urine showed evidence of a chronic cystitis. On September 26, 1928, the patient had a series of rigors, his temperature rising to 38.3° C. (101° F.) and he developed crepitations at the left base. The rigors ceased, but the temperature remained at a level of 38.3° to 39.4° C. (101° to 103° F.) till the patient died on October 6, 1928, with symptoms of a pericarditis.

*Post mortem* examination disclosed the following conditions: The heart lay in a large hæmopericardium, apparently some days old, as a large amount of fibrin had started to organize. A very small perforation was found on the posterior wall of the left ventricle, about 1.25 centimetres (half an inch) lateral to the interventricular septum and through this perforation appeared the point of a sharp piece of wire resembling a long pin without a head. The wire was 5.4 centimetres in length, sharp at the perforating end and blunt at the other end, with the greater portion of it lying within the cavity of the left ventricle, surrounded by a small amount of organized blood clot. There was definite atheroma of the ascending aorta, apparently of a specific nature.

The lungs showed a small amount of scattered bronchopneumonic consolidation.

The liver was affected by definite perihepatitis, apparently syphilitic. The urinary bladder evidenced a long-standing cystitis. Other organs were practically normal on macroscopical examination.

The great point of interest in this case is, of course, the port of entry of the wire found in the left ventricle and its mode of entry into the heart.

There was no evidence in the patient's history of such an object being swallowed or entering his body in any other way, nor was there any sign of a foreign body having perforated the œsophagus at any point.

The literature of the subject shows that migration of foreign bodies is possible from almost any portion of the body to the heart.

A case resembling this case in very many particulars has recently been reported by Dr. C. H. Mollison,<sup>(1)</sup> the perforating object in his case being a sharp fish bone.

#### Acknowledgement.

I am indebted to Dr. L. S. Latham under whose care the patient was, for permission to publish this report and to Dr. Andrew Brennan, Pathologist to the Hospital, for his valuable advice.

#### Reference.

- <sup>(1)</sup> C. H. Mollison: "An Unusual Cause of Death," *THE MEDICAL JOURNAL OF AUSTRALIA*, September 24, 1927, page 445.

#### HÆMORRHAGE INTO THE PERICARDIUM.

By A. T. EDWARDS, M.B. (Sydney),  
 Senior Medical Officer, Gladstone Mental Hospital,  
 New South Wales.

REPORTS of cases of sudden death from rupture of the heart wall or of a coronary artery have become so common as scarcely to merit mention. The writer has personally seen six within five years, all verified by *post mortem* examination. The following two cases, however, present rather unusual features.

#### Case I.

C.L., the patient, was a Chinese, aged seventy-eight. For the previous two years he had complained at times of pain in the left epigastrium, but owing to an inability to speak English, the diagnosis was difficult. It was possibly an anginal manifestation. The blood did not react to the Wassermann test.

On the day of his death he had tea at 5.30, after which he pulled his bed a few yards along the verandah. He was then observed to clasp his abdomen and to lie down in a doubled up position. He indicated to the attendant that he had low abdominal pain and then lost consciousness. On examination ten minutes later he was unconscious, with stertorous breathing, twenty per minute, and a slow pulse. There were left-sided facial paralysis and



a complete left hemiplegia. Superficial and deep reflexes were all absent. He died thirty minutes later.

*Post mortem* examination of the brain revealed intense oedema of the whole brain, the pia-arachnoid being greatly distended. Otherwise the brain appeared normal, with the exception of the usual diminution in volume usually found in old demented patients. The pericardium was found to contain about sixty cubic centimetres (two ounces) of fresh blood clot, the hæmorrhage being due to a small opening in the first branch of the left coronary artery. This rupture had occurred in a small atheromatous patch and close inspection displayed only two other visible patches of atheroma in the coronary circulation, whilst the aorta was practically free.

In view of the hemiplegic symptoms, the slow pulse and the intense oedema of the brain, it is suggested that the failing circulation and consequent fall of blood pressure, due to the impeded heart action, led to a thrombosis in the right cerebral hemisphere, death occurring too soon to allow of any demonstrable change in the brain substance. No definite thrombosis could, however, be demonstrated.

#### Case II.

J.F., a woman, aged fifty-five, was admitted only five days before death. Physically she showed signs of well advanced myxœdema, whilst her small stature (one hundred and forty centimetres or four feet eight inches), splayed hands and sunken nose suggested a subthyroid element from an early age. Unfortunately no history could be obtained. The blood did not react to the Wassermann test. Heart sounds and cardiac dullness were normal.

Since admission she had been constantly in bed, with the exception of visits to the bath-room and lavatory. For two days prior to death she had taken 0.3 gramme (three grains) of thyroïd extract daily. On the night previous to death she had slept from 10 p.m. to 5.30 a.m. On awakening she chatted to the nurse, but did not leave her bed, nor apparently arise from the recumbent position. At 5.50 a.m. the nurse who had not left the dormitory, found her unconscious in the same attitude as she had last seen her. She died within five minutes.

*Post mortem* examination revealed a tear nine millimetres (three-eighths of an inch) in length in the anterior wall of the left ventricle close to its junction with the interventricular septum. The pericardium was distended with loose blood clot. There were many patches of atheroma in the aorta and throughout the coronary system, whilst the myocardium showed greyish patches of fibrosis, through one of which the rupture had occurred.

It is interesting to note that the rupture took place whilst the patient was resting in bed and in a patient whose movements the subthyroid condition rendered slow and deliberate.

#### Acknowledgement.

I wish to thank the Medical Superintendent, Dr. H. H. Nowland, for permission to publish these cases.

### Reviews.

#### RECOVERY FROM ILLNESS.

IN his volume on convalescence Dr. John Bryant remarks upon the fact that so little attention has been paid to the subject, as is evidenced by the "chronic apathy of the profession" in regard to it.<sup>1</sup> He points out that the time required for complete recovery of a patient after discharge from hospital following a surgical operation or an acute infection is as long as that taken up by treatment in hospital.

The book begins with an historical account in chronological order of the various attempts to deal with the convalescent patient, particularly in England and France.

<sup>1</sup> "Convalescence, Historical and Practical," by John Bryant, M.D.; 1927. New York: The Sturgis Fund of the Burke Foundation; Royal 8vo., pp. 285, with illustrations.

This is followed by a description of the Burke Foundation which has endowed an institution of three hundred convalescent beds in the State of New York, and an account is given of its growth, building, organization, methods of treatment *et cetera*. Considerable space is devoted to a report of the Cleveland Hospital Health Survey which deals largely with the subject of convalescence. This report is said to have been described by Dr. C. W. Abbott, formerly resident of Harvard University, "as the most enlightened and far-sighted action yet undertaken in any community in the United States." Reference is made to the houses of rest founded by the Moscow Soviet and largely maintained by different unions for their members.

Dr. Bryant during and subsequent to the Great War organized and conducted a medical service in connexion with the American Army and he gives a detailed clear account of the work done under his supervision. A general consideration of the problem of convalescence follows and the book concludes with a review of the progress made in connexion with these problems from 1920 to 1927.

A great deal of information has been acquired from the "follow-up" of patients discharged from hospital. Inquiries show that in only 2.5% were the home surroundings favourable and adequate for convalescence. Nevertheless Dr. Bryant considers that convalescence at home under proper conditions and with the help of the social worker is better than convalescence in an institution.

The need for classification of convalescent patients into such groups as rheumatic, cardiac, mental, juvenile and with separate treatment in each division is also stressed.

The author's respect for the average working man has steadily risen during his investigation. He is impressed with the desire of this class of convalescents to work and to provide for their dependants, even at the risk of delaying their complete recovery. He believes too that the desire of patients and especially of women patients to know more of their ailments than is usually told them by their doctors is beneficial and aids much in convalescence.

The psychological condition of the recovery of the patient is considered and the belief is expressed that advantage should be taken of this period to improve the patient's mental equipment and thus help him to advance to a better economic and social position than he has previously attained.

The book is a mine of information on various problems of convalescence, written by one who is practically a specialist and whose experience has enabled him to form opinions that are deserving of careful consideration. It is well written and illustrated and is worthy of perusal by all medical men who desire that the cure of their patients is made as thorough as possible.

#### LAENNEC.

THE publishing firm of Paul B. Hoeber is to be congratulated on having made another addition to their list of biographies in a memoir of René Théophile Hyacinthe Laennec.<sup>1</sup> The book is an amplification of an address given before the Denver Clinical and Pathological Society to commemorate the centenary of the death of Laennec. The author, Dr. Gerald B. Webb, has told his story in a simple fashion. He has emphasized Laennec's early struggles, his financial difficulties and the deaf ear of his father to appeals for assistance, his persistence and determination to gain acceptance of his teaching in spite of his bodily infirmity and the opposition and ridicule with which his contemporaries received his work on examination of the lungs.

The story of Laennec was told in the pages of this journal early in this year by Dr. A. W. Holmes à Court, Dr. F. Guy Griffiths and Dr. L. Cowlshaw. It is one which will always act as an inspiration and as a reminder that by accurate observation and sound reasoning, valuable additions can be made to knowledge. This little book should find a place on the shelves of all those interested in medical history.

<sup>1</sup> "René Théophile Hyacinthe Laennec: A Memoir," by Gerald B. Webb, M.D.; 1928. New York: Paul B. Hoeber, Incorporated. Demy 8vo., pp. 166. Price: \$2.00 net.

## **The Medical Journal of Australia**

SATURDAY, DECEMBER 15, 1928.

### **The End of the Season.**

WITH the advent of the hot summer months the Branches of the British Medical Association in Australia go into vacation. The medico-political work has to be continued, but as a rule the members are not called to meetings during this spell; the Councils and their committees deal with the problems of immediate concern to the medical profession. During the year that is now drawing to a close the Branches have increased in size and the majority of them has manifested a very considerable activity. The public in ignorance of the constitution of the British Medical Association, indifferent to the objects for which it was founded and mistrustful of the readiness with which the members support those who are elected to the Councils, accuses this great organization of being the most autocratic trade union in existence. Some semblance of justification is brought to these arguments by the rash utterances of a few members whose views are out of tune with the opinions of the majority, and who have but little understanding for the professional ideals of their calling. The Branches of the British Medical Association in Australia can boast that their members represent a larger proportion of the medical profession than do the Branches in any other part of the Empire. The almost maximal adherence to the association is a matter for congratulation, but it should be associated with an unswerving loyalty to the body that exists for the furtherance of knowledge and for the maintenance of the honour and integrity of the profession.

With the growth of the medical profession there is an unmistakable development of the scientific achievement of its members. The Branches have an increasing number of members who can be invited to read papers at meetings. More and more original work is being carried out in Australia and in con-

sequence the value of the contributions is enhanced. The arrangements for the scientific meetings are entrusted to a committee of the Council in each Branch. This committee in nearly every State can afford to select the speakers from among those who offer to read papers and can also invite practitioners to prepare papers for this purpose. We venture to suggest that the committees to whom this is entrusted, should exercise care and judgement in their task of arranging the season's programme. The holding of meetings for the purpose of promoting knowledge is the most important function of the Branches and is one that should not be transferred to other bodies. In recent times it has become the practice of the majority of the Branches to hold clinical as well as ordinary meetings. The clinical meetings serve a very useful purpose, but they have relatively small value when recorded for those who have not been able to attend and to see the patients. The meetings of the special sections should not be allowed to interfere with the ordinary meetings of the Branch. The sections are formed by practitioners engaged in special branches of practice and their meetings should be used for the purpose of discussing the problems that are of especial interest to specialists. The members of the Branches can derive benefit if subjects are discussed by those who have made a special study of them. The functions of the sections are distinct from those of the Branches themselves and the committees should not be deterred by any desire of specialists to hold a technical debate among themselves in making their plans for the benefit of the members of the Branches. No paper of indifferent quality should be included in a programme. The subjects should be varied and embrace those concerning which new doctrines have been elucidated, fresh information has been gathered or special importance is attached. The test of the efficiency of the committees, particularly of the larger Branches, lies in the value of the papers read at the meetings.

The medico-political activities of the Branches at times appear to overwhelm the more important function of furthering the scientific work. These activities, however, are largely restricted to the Councils and their committees. Occasionally matters of concern to every member of the profes-

sion are debated at special meetings. The elected members sitting on the Councils are responsible to the members who elect them. Free debate is essential and each member should be given opportunity to explain his views. These debates are private. They are not intended for public perusal. From time to time information gained from meetings of this kind has found its way into the public press. Those who are disloyal enough to their colleagues and to their association, to supply the information, should be required to give an account of their dealings. Usually it is in the public interest that the decisions of the members of the profession on matters concerning the relations of the profession and the public should be published. The proper channel of conveyance of information is the medical press. The members in meeting or the Councils may determine to give to the daily press a statement for publication. No individual member should give information of this kind to political newspapers. The members could be of great service to their profession and to their association if they took more interest in their own affairs and if they exercised their right to express their views without restraint. The Councils would have more guidance than they have at present, if each man with a grievance would air it at a meeting.

### Current Comment.

#### SCLERODERMA AND CALCINOSIS.

THE main characteristics of the lesions of scleroderma or sclerodermia, as it has sometimes been called, are arterio-sclerosis with definite thickening of the walls of the smaller vessels and sclerotic changes in the skin and subcutaneous tissues. This sclerosis may lead to obliteration of some of the arterial channels. Coarse bands of connective tissue are found in the subcutaneous tissues and interwoven with these bands there are extensions from proliferating elastic fibres beneath the papillary layer of the skin. The result of these changes is to give rise to the "hide bound" appearance of the patient. The characteristic "hide bound" appearance is in rare instances complicated by the presence of calcified nodules. These nodules are found more particularly in the neighbourhood of joints, they are revealed by X ray examination and sometimes become inflamed, as in a case reported by Weber, and discharge thin purulent

matter mixed with calcareous *débris*. In 1911 Thiberge and Weissenbach published records of eight such cases collected from the literature and reported one of their own. Since that time other reports of a similar nature have appeared. The latest is one by Robert H. Durham<sup>1</sup> who writes from the Henry Ford Hospital.

Durham's patient was a woman, aged sixty-seven years, who had suffered from an ulcer of the lower part of the leg thirty-seven years previously. Edema of the leg had occasionally been present and small, bone-like areas appeared in the cutaneous tissues and gradually became more numerous. The ulcers healed at a later date, but recurred at intervals. The skin over the lower part of the legs became tight and drawn. It is important to note the order of the appearance of the lesions. From this short account of the clinical history it would appear that the calcareous nodules made their appearance before the changes generally associated with scleroderma were noted. The skin of the fingers was tight and drawn. Eventually the calcified areas in the legs protruded through the skin and in many places became fused into irregular plaques. X ray examination revealed extensive subcutaneous calcified deposits in the lower half of the legs and calcified nodules around numerous joints. The patient died of advanced chronic nephritis and uræmia. At *post mortem* examination extensive calcification was found throughout the whole of the vascular system. Several of the large arteries and veins had the form of a solid tube. A large calcified mass was present in the myocardium. Extensive calcareous changes were found in the aorta. Three parathyroid glands of ordinary size were found; their histological structure seemed "essentially normal." Among the other pathological changes found were colloid adenomata and old scars of the thyroid gland.

The combination of scleroderma and calcinosis is rare. The nine cases recorded by Thiberge and Weissenbach have already been mentioned. To these Durham has added records of thirteen from the accounts of various authors. His own report is the fourteenth. He states that the number of instances in which the combination has occurred, is sufficient to suggest that there is such a clinical and pathological entity. He finds that there is one case of scleroderma and calcinosis to every sixty cases of scleroderma. He admits that it might be questioned whether these figures indicate more than a coincident relationship between the two conditions. He points out, however, that it is doubtful whether X ray examinations have been made in any large number of cases of scleroderma. Some useful facts may be discovered and some interesting working hypotheses put forward from the consideration of this question.

In regard to the pathogenesis of scleroderma the suggestions have been numerous. A short article on this subject by Holmes à Court will be found in

<sup>1</sup> *Archives of Internal Medicine*, October, 1928.



THE MEDICAL JOURNAL OF AUSTRALIA of April 5, 1924. This writer stated that the three views which have received most attention are: (i) that the disease is in the nature of an angio-tropho-neurosis, (ii) that it is the result of endocrine disturbance, (iii) that a terminal endarteritis with resulting interstitial inflammation is the anatomical basis. In the same issue we drew attention to a report by Rowe and McCrudden on a case of a similar nature to that of Holmes à Court. The latter two observers attached great importance to the osteoporosis found in their patient. They attributed this bone atrophy to the variations of stress and strain to which the bone was subjected, in other words to disuse. The question of vascular changes as a cause of the bony changes was also discussed and it must be admitted that a great deal may be said for this view. There is another aspect, however, which may be considered in this connexion. At a recent discussion at a meeting of the New South Wales Branch of the British Medical Association, not yet published, Corlette discussed the question of osteoporosis in connexion with rickets. He pointed out that the bones supplied the calcium to the circulation and expressed the opinion that it was the parathyroid glands which regulated the removal of calcium from bone. If this view be applied to the calcification found occasionally with scleroderma, the source of the calcium will be evident and it will be necessary to postulate a disordered function of the parathyroid glands. It would be expected, if this were so, that some abnormality of these glands would be found on pathological examination. In Durham's case, however, no abnormality was found. As far as the question of osteoporosis is concerned, it is true that Rowe and McCrudden reported its presence, but Durham found none. He thought that the larger bones of his patient manifested an increase in density and he points out that, while rarefaction of the skeletal bones is usually a constant occurrence in so-called metastatic calcification, he has found that in scleroderma with calcinosis there is no rarefaction except osteoporosis due to disuse. He does not state how he determined that the rarefaction was due to disuse only. If the parathyroid-calcium view were accepted, it would be tempting to weave an hypothesis according to which scleroderma might be in part caused by a dysfunction of the parathyroid gland and the presence or absence of calcium deposits would be merely a question of the extent to which the condition had gone. In Durham's patient the calcium deposition appears to have occurred before the scleroderma was noted. The balance of evidence then goes to show that the parathyroid gland alone cannot be held responsible for the combined condition. As far as the arterial system is concerned, it must be remembered that Durham's patient suffered from extensive arterial disease and that she eventually died of chronic nephritis and uræmia. On the evidence it is safe to state that the kidney changes were secondary to the arterial. It is also reasonable to conclude that the condition which caused the calcification of the arterial walls, was in some measure responsible for

the calcification in the subcutaneous tissues. It is, of course, difficult to determine why certain sites should be picked out for the deposition of the nodules. The conditions which predispose the tissues for the occurrence of scleroderma, may be presumed to predispose them for the occurrence of the calcareous nodules.

Durham states that there are several mechanisms through which calcification might conceivably occur in association with scleroderma: (i) as a result of parathyroid dysfunction, (ii) as metastatic calcification, (iii) by simple chemical precipitation, (iv) by means of a physico-chemical disturbance in which colloidal proteins play a part. He concludes that it is nowise clear whether calcinosis with scleroderma results from local metabolic alterations or deranged inorganic metabolism. He adds that, as in other types of pathological calcification, the colloidal proteins probably play a prominent rôle. It may be postulated for the present that the scleroderma is the underlying factor and that scleroderma with calcinosis is a clinical entity only in so far that the calcification takes place at a site either already affected by scleroderma or predisposed to it. The calcification may be due in part to vascular changes or to a disorder of the calcium metabolism, connected with the parathyroid glands. The pathology of scleroderma is a much wider and more obscure problem.

#### A CHRISTMAS APPEAL.

DR. E. S. LITTLEJOHN, the Honorary Treasurer of the Medical Benevolent Association of New South Wales, has requested us to make an appeal to readers of THE MEDICAL JOURNAL OF AUSTRALIA on behalf of the beneficiaries of the Association. We do so gladly. Dr. Littlejohn and the members of his Council are anxious to make a small Christmas present to each person in receipt of regular help from the Association. The help which is given, provides a bare living and leaves no margin for luxuries or pleasures of any description. Great care is exercised in allotting the available funds and it can be stated without fear of contradiction that the help received by the Council is not commensurate with the wealth of the medical profession. At Christmas time an effort should be made to help those who cannot help themselves. Donations may be sent to Dr. Littlejohn at 30-34, Elizabeth Street, Sydney.

#### INDEX TO "THE MEDICAL JOURNAL OF AUSTRALIA."

THE index to Volume II, 1928, of THE MEDICAL JOURNAL OF AUSTRALIA will not be included as heretofore in the last issue of the volume, but will be printed separately and will be forwarded to those members of the several Branches who intimate in writing to the Editor that they wish to receive it. The intimation should reach the office of the journal not later than December 31, 1928.

## Abstracts from Current Medical Literature.

### RADIOLOGY.

#### Pancreatic Lithiasis.

S. J. SEEGER reviews the literature and reports a case of pancreatic stone (*Radiology*, February, 1928). Only twenty-six cases of pancreatic calculi have been reported in the English and foreign literature. The presence of a pancreatic stone stimulated the work of Banting. Obstruction of the pancreatic ducts is accompanied by atrophy of the pancreas, but the islands of Langerhans remain intact, even when the acini disappear completely and as a result a glycosuria does not develop unless an interstitial pancreatitis is superimposed. A pancreatic calculus is composed mainly of carbonate of calcium and the normal pancreatic secretion does not contain this salt; this indicates that altered secretion precedes stone formation. The largest reported calculus was seven centimetres in diameter. No definite clinical symptoms can be described and the calculi reported have been discovered only at operation. Shadows apart from the duodenum and gall bladder may be looked upon with suspicion.

#### Lung Abscess.

W. F. MANGES (*Atlantic Medical Journal*, September, 1928) contributes a symposium on lung abscess following tonsillectomy from the viewpoint of the radiologist. Such abscess is characterized chiefly by wide variations in location, time of onset, severity of reaction, extent of involvement and response to treatment. The majority occurs in the lower lobes, especially on the right side. They are generally in close relation to a large bronchus and those near the hilum are due to the inhalation of septic material at operation. There may be a well-defined abscess, forty-eight hours after operation, but in slow infections the onset may be insidious and not diagnosed for weeks. The acuter the onset, the more severe the reaction. The abscess may be small or may involve a large portion of a lobe. Abscesses which can be drained early, especially through a bronchoscope, are attended by good end results. Abscesses close to the surface and in the upper part of the chest are suitable for surgical measures. In early stages the bronchial tubes may be seen through the exudate, but there is little tendency to sharp demarcation of the lesion. When reaction is good, the edges of the abscesses become more sharply demarcated. The abscess should be carefully localized before operation.

#### Eventration of the Diaphragm.

A. E. USPENSKY (*British Journal of Radiology*, June, 1928) reports five cases of eventration of the diaphragm in children. This type of eventration

is permanent and not the temporary type seen after acute infections and the subjects were kept under observation for two or three years and screen and photographic examinations were made at intervals. Exaggerated outward excursion of the left costal margin was found. This condition may be congenital or due to affections of the alimentary tract (meteorism, aerophagy or phrenic nerve pressure); in the author's patients the condition was congenital and was noticed only on screen examination. A congenital defect in the development of the diaphragm was the cause in all cases. Pleural adhesions and alimentary troubles were secondary to the eventration and not the cause of the condition.

#### Diagnosis of Ileus.

J. T. CASE (*American Journal of Roentgenology*, May, 1928) calls attention to the aid given by Röntgen examination in the diagnosis of ileus. It is possible to demonstrate distended coils of small intestine in all cases. A bedside unit may be used; bandages need not be removed nor an opaque meal given. Interpretation is made from the gas areas in the abdomen and it may be decided whether the small bowel is dilated to a degree sufficient to warrant a diagnosis of acute obstruction. In small bowel obstruction there may be a "herring bone" appearance or a ladder arrangement with hugely distended loops. The latter is the more serious appearance and calls for urgent operation. Even a short distended intestinal loop means obstruction. Gas and fluid commence to form in six or eight hours. Distended small intestine coils are generally situated centrally. Colonic gas generally occupies the periphery of the abdomen mostly in the caecum or sigmoid flexure and the colonic haustration is present. When doubt exists as to whether gas is in the colon or ileum, an enema may be given.

#### Gastric Syphilis.

A. B. MOORE AND J. R. AURELIUS report a series of cases of gastric syphilis (*American Journal of Roentgenology*, May, 1928). Almost all authenticated cases of gastric syphilis are diffuse gummatous infiltrations with thickening and contraction of the gastric wall. Frequently the mucosa of the infiltrated wall is ulcerated. The chief X ray sign is a concentric symmetric filling defect, affecting both curvatures equally with narrowing of the gastric lumen. Rugæ are obliterated and the gastric wall is less pliable to the palpating finger. The margins of the barium shadow are clear cut and distinct. The prepyloric region is always affected. In some instances the whole of the stomach is affected and it is converted into a narrow tube. No mass comparable with the defect is palpable. Patients with large defects as described are neither cachectic nor proportionately weakened. Patients improve on antisyphilitic treatment.

#### The Pulpless Tooth.

J. F. BRAILSFORD (*British Journal of Radiology*, September, 1928) deals with the pulpless tooth in relation to disease. A tooth which has been deprived of its pulp, has lost its vital power and when dead organic matter is brought into contact with the blood circulating through the dentino-cemental foramina, it is liable to be infected by organisms in the blood. Bacteriological experiments reveal that no known medicament used in the treatment of infected teeth, will prevent the formation or persistence of toxins after forty-eight hours. Cultures from teeth so treated will produce death when injected into animals. The extent of a periapical infection is always far greater than the radiographic picture suggests. The author advises the viewing of X ray negatives of teeth through a magnifying lens. Every tooth which is producing systemic symptoms, will produce definite changes in a skiagram. The dentist is loath to extract teeth showing slight changes, although such teeth are frequently the cause of rheumatic symptoms. The denser the areas of bone surrounding a periapical septic focus, the greater the reaction to the infecting organisms. Faulty radiographic technique may lead to errors in interpretation, but there are many mistaken diagnoses made from actual misinterpretation of good skiagrams. Such misinterpretation is due to lack of experience in interpretation of dental skiagrams and lack of knowledge of general and dental pathology. Fine detail loss generally means a moderately virulent type of infection.

### PHYSICAL THERAPY.

#### The Effect of Röntgen Rays Upon Bacterial Inflammations.

WALTER SCHAEFER (*Strahlentherapie*, Band XXV, 1927) has infected locally with *Staphylococcus aureus* a series of rabbits; he has irradiated them and later on studied them histologically. Each animal received 20% of the skin erythema dose, filtered through heavy metal, at 30 centimetres skin distance. The skin erythema dose of the apparatus used was 450 Röntgen units. The exposures were made locally, the rest of the animal being shielded by lead plate. The histological study included the skin, subcutaneous connective tissue and the muscle lying underneath. Thirteen hours after the irradiation of the normal animal the picture in the muscle was very much changed, while the skin and subcutaneous connective tissue were normal. In the muscle there was an accumulation of cells described as proliferated perimyosial cells. These cells reach their maximum on the sixteenth day. Examination of the irradiated and non-irradiated infected tissues revealed no difference in the type of cells accumulating as a result of irradiation. There seems to be some difference in the quality of the cells

in the muscle tissue and in the developing connective tissue indicating the healing process. No difference could be observed between the appearances in rabbits irradiated six hours after infection and those in rabbits infected but not irradiated. It appears, therefore, that after a definite interval from the time of infection the tissue becomes especially sensitive to the irradiation, namely, when the classical symptoms of inflammation have made their appearance. It follows that an inflammation cannot be prevented by irradiation. In every instance a large or small abscess occurred after a certain period. It is, however, noteworthy that in the irradiated animals the abscess opened shortly after the irradiation, while in the unirradiated animals operation revealed the abscess to be quite solid. In the irradiated animals the time for recovery was in general short as compared with animals not irradiated.

#### Light Therapy in Oto-Laryngological Conditions.

MAURICE WEISBLUM (*Laryngoscope*, November, 1927) states that the value of infra-red rays as a therapeutic agent has only in recent years been recognized. These rays occur at the near end of the spectrum and have a wave length of more than 7-700 Ångström units. They penetrate the tissues to a depth of twenty-five centimetres (ten inches) and when they are absorbed, heat is generated. The strength of the rays is directly proportional to the heat and size of the electrodes and varies inversely as the square of the distance. The use of these rays is indicated in various conditions, such as trifacial neuralgia, congestion in *otitis media* and furuncles of the eye and nose. The penetration depth of ultra-violet rays is 0.79 millimetre (one thirty-second of an inch). These rays are actinic in character and produce chemical changes in all matter upon which they impinge. It is believed that this radiant energy is absorbed by the blood, that the endocrine glands are stimulated thereby and that the calcium and phosphorus content of the blood is raised. The fact that the ultra-violet rays destroy tubercle bacilli very rapidly, makes them an important adjunct in the treatment of tuberculous ulcers of the tongue, pharynx and larynx. Their use is also indicated when malignant disease is present.

#### Unification in Nomenclature of Röntgen Irradiations.

GEORGE H. SCHNEIDER (*Strahlentherapie*, Band XXV, 1927), states that considerable confusion has arisen in the literature owing to the fact that different names have been given to the same dose of X rays and different doses have been described by the same name. In order to unify nomenclature of the different types of irradiation the suggestion is made that the term "mild irradiation" be used only as a general, comprehen-

sive term for irradiation with doses lower than the threshold value for the ovary by direct exposure and characterized by menostasis. In the report of a definite treatment of any individual patient the above term should be avoided. Under mild irradiations may be listed the two following classes: (i) minimal irradiations, by which is to be understood the smallest systematic dosing with radiation and also the dose for the treatment of inflammatory diseases as recommended by Heidenhain and Fried; (ii) ovarian stimulative irradiation which requires two to three times the above dose; like the above this also designates direct effect of the Röntgen rays upon the ovary or an indirect one on the particular organ treated by way of the vegetative nervous system without any direct function-stimulating effect in the irradiated region. In contrast to these subthreshold irradiations there is the direct strong irradiation producing necrobiosis and requiring doses which are always stronger than the demonstrable threshold dose. In this group are to be included: (i) the dose producing temporary castration and (ii) the dose producing permanent Röntgen amenorrhoea and in these two groups the term mild irradiation should be eliminated.

#### Diathermic Heat and the Joule Effect.

H. BORDIER (*La Presse Médicale*, February 8, 1928) states that according to Joule's law the heat generated in a conductor traversed by an electric current is proportional to the resistance of the conductor and to the square of intensity. This law holds true of continuous currents and of currents of low frequency, but is not applicable to high frequency currents. Certain experiments performed by the author have shown that the law is not true of the heat generated by diathermy, be the conductor electrolyte, colloid or living tissue. Experimenting with progressively decreasing solutions of salt, d'Arsonval found his results to be in complete disagreement with Joule's law. The heat at first increased in proportion as the resistance increased, then it reached a maximum and following that it progressively diminished as the resistance continued to be increased. The same divergence was found when more complex solutions were used, such as tap water and human urine. The same results were obtained with colloidal gold solutions; heat diminished in proportion to the increase in resistance. The explanation given by d'Arsonval is that the medium traversed by the oscillations of high frequency does not act only as a conductor, but rather as a medium having at the same time a resistance of an electrical capacity. Thus there pass from one electrode to the other a current of conduction and a current of condensation. The effects of these two kinds of currents augment each other or neutralize each other, according to the condition. Fabry has arrived at a mathematical equation in perfect agreement with d'Arsonval's

experiments. The above statements are also true for living tissues which are really combinations of electrolytes and colloids. The milliampere-meter does not furnish correct results as to the temperature generated in the tissues. The best way is to measure the temperature at the surface covered by the electrode, particularly at the active electrode (of smallest surface). The use of thermoelectric junctions is best adapted for estimating the heat under the electrodes by the pyrometer with automatic correction according to the method of A. Walker. The question is still being studied and it is hoped that it will receive a practical solution in the near future.

#### The Detection of Ringworm.

N. GRAY HILL (*British Journal of Children's Diseases*, Volume XXV, 1928) details the uses of Wood's glass in the detection of ringworm by fluorescence at Queen Mary's Hospital for Children, Charsalton. Wood's glass or Chance's ultra-violet glass is of the thickness of ordinary window glass and is of a deep violet colour. It transmits only the shortest rays of the visible spectrum, between 70% and 80% of the ultra-violet, in the region between 4,000 and 3,000 Ångström units. The method used is to have a small piece of the glass, about five centimetres (two inches) square, in an applicator that can be fixed in front of a Kromayer lamp. The room in which the examination is carried out, should be darkened, but not too dark, as this tends to frighten the children and so hinder the work. The lamp is held 5.0 to 7.5 centimetres (two to three inches) from the scalp with the child seated in a chair. The infected hairs light up as they come under the rays of the lamp, taking on a most vivid green colour, while uninfected hairs and scalp are only just visible in the purple light. Ointments in the hair may fluoresce, for example, vaseline, "Brilliantine," but usually with a blue light which is in striking contrast to the vivid green of the infected hairs. This method provides an easy diagnosis even in very early cases and is of great value in determining when cure is complete, but it is less satisfactory in *lichen planus* localized in the lower extremities and penis. It seems to be unsuccessful in controlling *lichen planus*, *corneus* and *verrucosus* of the leg. In all cases except the two failures, the irradiation caused a disappearance of the itching after which there was an immediate regression of the local lesion. Immediately after irradiation the itch became stronger, but it decreased in a few days. In two of the patients the increased itch was accompanied by a distinct exacerbation of the local foci. The technique of irradiation is not yet settled, since improvements seem to be possible. Apart from the practical interest in this method of treating *lichen ruber*, it is possible that it may lead to an elucidation of the still obscure origin of this condition.



## Medical Societies.

### THE MATER MISERICORDIÆ HOSPITAL CLINICAL SOCIETY.

A MEETING OF THE MATER MISERICORDIÆ HOSPITAL CLINICAL SOCIETY was held at the Mater Misericordiæ Hospital, Brisbane, on October 16, 1928.

#### Osteomyelitis of the Tibia.

DR. J. C. HEMSLEY showed a boy, aged fourteen years, who had been admitted to hospital five weeks earlier suffering from osteomyelitis of right tibia. The history was that the boy had fallen and hurt his right ankle. Two days later the right leg and ankle had been very painful and his temperature  $39.4^{\circ}$  C. ( $103^{\circ}$  F.). When he fell he had complained of pain in the neck and shoulder, but this had cleared up.

On examination there had been a fluctuant swelling over the internal aspect of the lower end of the right tibia. At operation pus had been present under the periosteum and also in the bone, so about ten centimetres (four inches) of the lower end of the right tibia had been opened up and then packed loosely.

The patient's temperature had subsided a little, but had not fallen to normal for about two weeks.

Shortly after the operation he had complained of pain in the left hip joint, but this had cleared up in a day or so.

About two days before the meeting the boy had developed a slight rise in temperature, but had not complained of any pain. At the same time a swelling had appeared over the inner third of the right clavicle. It had come quite suddenly and had not been painful. On palpation crepitus could be easily elicited. The question was whether it was a pathological fracture or one due to metastatic infection and what the subsequent treatment should be. The radiologist reported: (i) Fracture of the inner one third of the clavicle through an osteomyelitic area, (ii) osteomyelitis of the scapula along the axillary border including the glenoid process.

An X ray report of the left hip joint taken at the same time was that there was infection of the periosteum round the neck of the femur.

#### Sequel to Enteric Fever.

DR. C. F. DE MONCHAUX showed a patient who had been admitted to hospital seven weeks before with signs of typhoid fever, but whose infection, had not been quite typical. The patient, a young man, had been ill for two weeks before admission. On admission the Widal test had yielded a reaction and the bowel condition had soon settled down, but the patient had remained for six weeks with an intermittent pyrexia reaching to  $38.3^{\circ}$  C. ( $101^{\circ}$  F.).

For the last two or three weeks he had appeared quite well, had been eating and sleeping well and had no discomfort or pain.

Dr. de Monchaux thought that the patient must have a latent infective focus, but the question was where was it to be found. Three weeks previously the patient had complained of pain in the right upper part of the epigastrium. It was thought he might have a subphrenic abscess, but there were no signs of it in the skiagram, taken at the time. The patient's general condition was good. He had been seen by Dr. J. C. Hemsley in consultation, but nothing requiring surgical interference had been detected.

There was a possibility that the patient might be suffering from a subacute gall bladder condition following on a mild paratyphoid infection. Another possibility was an interlobar pleurisy, but he had not had any cough or sputum. For a few days he had had a slight friction rub at the right base, but that had soon disappeared. The continuous nature of the pulse rate, 88 to 100, and respiratory rate, 20 to 26, was against this.

The urine was clear. The blood count was: the erythrocytes numbered 4,200,000 per cubic millimetre; the leucocytes numbered 15,000 per cubic millimetre. The colour index was 1.7 and the hæmoglobin value was 60%.

The X ray report was that the liver was enlarged, but there was no sign of fluid or abscess. The right diaphragm was displaced slightly upwards.

The blood had been examined for the presence of filaria, but none had been found.

The question was: (i) where the infective focus was, (ii) whether exploratory laparotomy would be justifiable, as there was a possibility of subacute cholecystitis.

#### Intraabdominal Pregnancy.

DR. MILTON GEANEY reported a case of intraabdominal pregnancy which had developed to about four and a half months. The history was that the patient had not been well for about three years. She had suffered from abdominal pain especially before menstruation. She had menstruated regularly, but for the last three months she had had almost continuous vaginal bleeding with numerous clots. On examination a mass had been palpable in the abdomen reaching up to the umbilicus. This was thought to be a fibroid.

At operation on opening the abdomen the first thing noticed was that the descending colon was flattened down on top of the mass which was found to be retroperitoneal. The mass was growing from the left hand cornu of the uterus which was very small. The mass had spread into the mesentery of the descending colon. An opening had been made into the mass and a macerated foetus of about four and a half months development had been found. It had been impossible to remove all the placenta so a tube had been put in and it was hoped the remainder of the placenta would slough out.

#### Pulmonary Abscess.

DR. R. J. HAYNES showed a patient who was suffering from pulmonary abscess. The patient was a young man who had attended the out-patient department six months earlier suffering from cough with purulent sputum. He was losing weight. It was thought he had an empyema. He had been examined by X rays and the report had been to the effect that there was present an unresolved pneumonia or an interlobular empyema. The patient had done well on expectorant mixtures and had not attended the out-patient department for some time. Then he had come back as bad as ever. The X ray report had been much the same. The patient had been admitted to hospital for one month and then discharged. He had been well for a time and then the symptoms had returned and he had seemed to get much worse and had begun running a septic temperature. Dr. H. Foxton had then injected fifty cubic centimetres of "Lipiodol" into the affected side of the chest. After this procedure the patient had coughed up fully five or six hundred cubic centimetres (a pint) of pus and had seemed relieved for a time. X ray examination of the chest made after the injection of the "Lipiodol" had shown the "Lipiodol" outlined a large bronchiectatic cavity. The patient was to be operated on for pulmonary abscess.

#### Acute Dilatation of the Stomach.

DR. E. D. AHERN reported a case of acute dilatation of the stomach. The patient, a man, had been suffering from intestinal obstruction due to cancer of the sigmoid with an abscess. At operation the sigmoid had been removed with the glands and the abscess had been drained. Five days later the patient had developed acute dilatation of the stomach. The stomach had been washed out, a proceeding which distressed him very much. Then a small Rehfus tube had been passed into the stomach and through this 1.5 litre (fifty ounces) of fluid had been drained. Then the sucker had been put on the end of the tube and the stomach sucked dry. There had been no recurrence of the dilatation after this treatment.

#### Local Anæsthesia.

DR. J. C. HEMSLEY read a paper entitled: "Local Anæsthesia" (see page 749).

DR. ALEX MACDONALD thanked Dr. Hemsley for his paper and agreed with him on all points. He said local anæsthesia had long been in use in eye work, for example in removal of a cataract or removal of an eye. He preferred using cocaine to "Novocain." With 1% cocaine light

anæsthesia in the eye could be obtained in fifteen seconds and deep anæsthesia in thirty seconds.

DR. C. F. DE MONCHAUX thanked Dr. Hemsley for his paper and gave an account of his experiences with local anæsthesia from the subjective point of view.

DR. ALAN E. LEE thanked Dr. Hemsley for his paper. Dr. Lee liked local anæsthesia for its psychological effect; it allowed the surgeon to take time to do an operation. Dr. Lee thought it was not possible to explore satisfactorily an abdomen by using the infiltration method, but that outside the abdomen all operations were better done under local anæsthesia.

Dr. Lee did not agree with Dr. Hemsley in giving sedatives with local anæsthesia; the one operation in which he would feel inclined to do so was that for exophthalmic goitre. He had successfully operated on the upper and lower lips and done trephining under local anæsthesia. He considered local anæsthesia was better in a case of acute intestinal obstruction than general anæsthesia, as in the latter the patient was likely to be drowned in his vomit.

DR. B. L. W. CLARKE asked if there was any difference in healing after an operation done under local anæsthesia and one under general anæsthesia. He had noticed in diathermy that wounds made under general anæsthesia healed more quickly than those made under local anæsthesia.

Dr. Hemsley in reply said that he thought that sedatives helped the patient especially in big operations. Perhaps it was not necessary in small operations. He thought that there must be a difference in the length of time in healing between those wounds made under local anæsthesia and those made under general anæsthesia, although he had not noticed any difference in his own patients.

## Public Health.

### ETHYL PETROL.

THE English Departmental Committee on Ethyl Petrol was appointed in 1928 "to inquire into the possible dangers to health resulting from the use of motor spirit containing lead tetra-ethyl or similar lead-containing compounds and to report what precautions if any, are desirable for the protection of the public or of individuals in connexion with the use of handling of such motor spirit." Its interim report has been issued.

For some years numerous investigations have been carried out with a view to improving the efficiency of internal combustion engines by providing a fuel which would allow of a higher compression in the cylinders. Up to the present tetra-ethyl has proved the most effective. In 1923 a fuel known as ethyl petrol was placed on the American market. This fuel consists of a mixture of petrol and ethyl fluid, the ethyl fluid being composed of lead tetra-ethyl, ethylene dibromide and monochloronaphthalene. The amount of ethyl fluid added to the petrol varies according to the nature of the petrol, but in no case does the amount of lead tetra-ethyl in ethyl petrol, sold for ordinary commercial purposes, exceed one part in 1,300 parts by volume or about one in 650 by weight. Lead tetra-ethyl is a very poisonous substance and its manufacture, its blending with other materials to produce ethyl fluid and the mixing of the latter with petrol, must be carried out with very great care. Sufficient precautions were not at first taken in the manufacture and handling of lead tetra-ethyl and in 1924 a number of deaths resulted in the United States. These deaths naturally created considerable anxiety and in 1925 the Surgeon-General of the United States Public Health Service appointed a government committee to ascertain "what health hazards were involved in the retail distribution and general use of tetra-ethyl lead gasoline as an automobile fuel." This Committee decided to base their investigations chiefly on human subjects who had for a considerable period been handling and using ethyl petrol. Observations were made on the following groups of workmen: A control group of

36 chauffeurs of cars using ordinary petrol; a test group of 77 chauffeurs of cars using ethyl petrol only since July, 1923; a control group of 21 workers in garages, at service stations or on delivery trucks, ordinary petrol only being handled by these men, a test group of 57 workers engaged on work similar to that of the preceding group, except that ethyl petrol was used; a control group of 61 workers at works where a recognized lead hazard existed, such as accumulator works, this group being selected in order to check the adequacy of the clinical and analytical methods used. The observations extended over a period of approximately six months. Each individual was subjected to a careful clinical examination and in addition smears were made from the blood and a specimen of feces was collected. The Committee further made inquiry into the few reported cases of injury to health which might have been due to the use of ethyl petrol. They satisfied themselves that these cases afforded no evidence of harmful effects attributable to the use of this material and as a result of their investigations stated that the following general conclusions were justified:

(1) Drivers of cars using ethyl petrol as a fuel and in which the concentration of tetra-ethyl lead was not greater than one part to 1,300 parts by volume of petrol showed no definite signs of lead absorption after exposure approximating two years.

(2) Employees of garages engaged in the handling and repairing of automobiles and employees of automobile service stations may show evidence of lead absorption and storage, as indicated by the lead content of the feces and the appearance of stippled cells in the blood. In garages and stations in which ethyl petrol was used the amount of apparent absorption and storage was somewhat increased, but the effect was slight in comparison with that shown by workers in other industries where there was a severe lead hazard and for the periods of exposures studied was not sufficient to produce detectable symptoms of lead poisoning.

(3) In the regions in which ethyl petrol has been used to the greatest extent as a motor fuel for a period of between two and three years no definite cases have been discovered of recognizable lead poisoning or other disease resulting from the use of ethyl petrol.

In view of these conclusions the United States Committee reported that in their opinion there were at the time of their report no good grounds for prohibiting the use of ethyl petrol of the composition specified as a motor fuel, provided that its distribution and use were controlled by proper regulations. Other American observations which confirm the findings of the United States Committee, have been upon a more extensive scale than was possible for that report. Four sets of regulations were suggested by the United States Committee. These regulations related to the manufacture of lead tetra-ethyl and the blending of the latter with other materials to make ethyl fluid, the mixing of ethyl fluid with petrol, the distribution of ethyl petrol and the ventilation and cleaning of garages *et cetera*, irrespective of the use of ethyl petrol. The regulations suggested in regard to distribution were as follows:

(1) Each filling station shall have prominently displayed at the pump or in other conspicuous place, the following warning or one of similar effectiveness:—"Ethyl gasoline containing tetra-ethyl lead. To be used as motor fuel only and not for cleaning or any other purpose."

(2) Suitable leaflets shall be available at all filling stations where ethyl gasoline is sold, for distribution on request. These leaflets shall describe the possible dangers and precautions to be taken in the use of ethyl gasoline.

(3) Containers of ethyl gasoline sold to the general public shall be labelled: "Ethyl gasoline containing tetra-ethyl lead. To be used for motor fuel only, and not for cleaning or any other purpose."

No American State has passed a law to enforce these regulations, but the precautions outlined in them have been adopted by the vendors. The fear of danger to health arising from the use of ethyl petrol is mainly due

to the recognition of the lipid solubility and peculiar toxic qualities of lead tetra-ethyl and of cumulative effects of lead. The fact must be emphasized that the American deaths occurred in connexion with the manufacture and handling of lead tetra-ethyl and were in no way attributable to the use of the diluted mixture sold as ethyl petrol, which contains not more than one part in 1,300 by volume of lead tetra-ethyl.

Certain witnesses who appeared before the English Departmental Committee, stated that the petrol in ethyl petrol will evaporate and leave pure lead tetra-ethyl behind and that therefore the splashing of ethyl petrol on the skin is not essentially different from the splashing of the pure lead tetra-ethyl. Further that any lead tetra-ethyl which might be inhaled, would be at once absorbed and that having regard to its volatility it is dangerous to allow its use with petrol. Evaporation tests carried out by the Committee show that when ordinary motor spirit mixed with the commercial proportion of lead tetra-ethyl is evaporated at either blood heat or at room temperature, the first half of the petrol evaporated is free from lead tetra-ethyl and that a residue is obtained, not consisting of pure lead tetra-ethyl, but of a mixture of hydrocarbons like kerosene, containing about 4% of its weight of lead tetra-ethyl. There would thus seem to be no risk of inhaling lead from ethyl petrol in tins or tanks and the lead tetra-ethyl left after evaporation of the bulk of the petrol is small and diluted with hydrocarbons.

The Departmental Committee in their interim report make the following conclusions:

Having very carefully considered the experimental work which has been done in the United States in regard to the use of ethyl petrol, and the evidence which we ourselves have taken, and having had the advantage of discussing the matter with Surgeon-General Cumming and Dr. Leake, of the United States Public Health Service, we have come to the conclusion that the findings of the United States Government Committee were justified. In our opinion the further experience since that Committee reported has supported their conclusion that there were no reasons for prohibiting the use of ethyl petrol. Although there is no evidence to show that the use of ethyl petrol as a motor fuel involves more dangers to health than the use of ordinary petrol, we think for the time being the precautions indicated in the Regulations suggested by the United States Committee are desirable. In particular we wish to emphasise the warning that ethyl petrol should be used only as a motor fuel and not for such purposes as cooking or cleaning. No regulations have actually been made in the United States as regards the distribution of ethyl petrol, but careful observance of the regulations recommended in regard to notices to the public, the labelling of cans and pumps, the distribution of leaflets and the dyeing of the substance red as an additional check against its use otherwise than as a motor fuel, has been secured by the terms of the contracts between the proprietors of the fuel and the retailers. Sales in this country are governed in the same way and we do not desire to recommend any legislative action so long as the terms of the contract are maintained. We think it well to point out that adequate ventilation of all garages whether or not ethyl petrol is used is a matter of considerable importance and that the danger from carbon monoxide in an unventilated garage is very serious. Having regard to the somewhat alarming statements made in the House of Lords and in the press, it has seemed to us, desirable to make this interim report and to publish the evidence which we have taken. Owing to the small consumption of ethyl petrol in this country it would be impossible at present to embark upon an extensive examination of human subjects and in view of the scope and thoroughness of the investigations of this type made in the United States, we consider it would be superfluous to do so. The value of such work is in proportion to the length of time it has been carried on, and in this respect any investigations in this country would necessarily fall short by three years of the United States investiga-

tions, which are still being continued. We have, however, decided to make some investigations with a view to confirming certain points in the work carried out in the United States and possibly elucidating some points which are not covered by that work.

## Obituary.

### HARRY JOHN CLAYTON.

To many medical practitioners of the younger generation the news of the death of Harry John Clayton came as a shock and as a cause for profound regret. In a short professional career he had made many friends and had established a reputation as a physician whose opinion was based on sound common sense.

Harry Clayton was born in Sydney forty-two years ago. He was a son of the late John H. Clayton, solicitor. He was educated at Sydney Grammar School where he established a reputation in the football field. He frequently represented his school in football matches and there can be no doubt that his experiences here laid the foundation for the many sportsmanlike qualities which characterized his after-life. At the University of Sydney he was a successful student. During his third year he went into residence at Saint Andrew's College. He gained his blue for football and was known as one of the best "forward" players of his time; he always played in the front row. He was a member of the Sports Union Committee. After graduation he became a resident medical officer at the Royal Prince Alfred Hospital and subsequently served in the senior positions of surgical and medical registrar and anaesthetist. He gave such satisfaction by the way in which he carried out his duties that his friends were not surprised when in 1914 he became Medical Superintendent. Then came the war. Clayton belonged to the Australian Army Medical Corps before August 4, 1914, and he was anxious to do his share. He was granted leave of absence and sailed with the rank of Captain as Registrar to the Second Australian General Hospital. He was later on transferred to the Fourth Field Ambulance and saw service at Gallipoli. He was on the Peninsula until the evacuation. Soon after the return to Egypt he was recalled to Australia. The authorities at the Royal Prince Alfred Hospital were finding it difficult to "carry on." The resident medical officers were all desirous of serving and it was felt that the hospital needed the services of someone who had experience of the duties of the superintendent's office. The late Thomas Anderson Stuart cabled to Sir Neville Howse and asked for Clayton's return. He came back regretfully, having in the meantime been promoted to the rank of Major. He held the position of Medical Superintendent until 1920. When he resigned, he was appointed Honorary Assistant Physician. He was recognized as a successful teacher and became Medical Tutor. He was popular with the students and was recognized by his *confrères* as a sound clinician.

Clayton's spare time was devoted to golf, tennis and horse racing. He was a keen follower of the last named sport. He had a personality which endeared him to many. His friends in the medical profession and in the sporting world are taking steps to perpetuate his memory. An announcement to this effect appears in another place in this issue. The sympathy of the medical profession is offered to his widow.

Dr. Eric Fisher writes:

The news of Harry Claytons' death came as a great shock to a wide circle of friends, colleagues and patients, for in every sphere in which he moved he stood out among his fellows.

After leaving the Sydney Grammar School he began his medical course in the Sydney University in 1906. He entered fully into the life of the University and from his third year was in residence at Saint Andrew's College. Football was his favourite game and although he was a lightweight, the fearlessness and tenacity which characterized all his life gained him his blue. He graduated in 1910 and at once began his association with the Royal Prince Alfred Hospital which was to last till his death.



In 1914 he was appointed Medical Superintendent, a position which he held till 1920, with a break of about eighteen months while on leave of absence at the war.

From 1916 onward he had a difficult task to keep the wheels revolving smoothly at the hospital owing to a great shortage of honorary and resident medical officers and of hospital supplies, but he did so with conspicuous success.

In 1920 he was appointed Honorary Assistant Physician and soon after that Medical Tutor and the same success characterized his hospital work and teaching of students.

He could be tactful, firm, humorous, vigorous in word or action and would fearlessly maintain his opinion against anyone, even the most exalted. So just and fair was his administration that his memory is still treasured among the lay staff of the hospital.

He was a man with a gift of making friends and keeping their affection and in every section of the community there are some to miss him.

About his end we will never know everything. For many months he had been a sick man. His illness started with severe insomnia and depression and later proved to be manic-depressive psychosis, but he had so far recovered that he seemed almost the old Harry Clayton. I am sure he was well enough to realize how ill he had been and what the future held and that with calm courage he made his decision. And so we lost a beloved friend and colleague and a gallant gentleman.

#### WILLIAM EDWARD DAVIES.

It is with regret that we record the death of Dr. William Edward Davies which occurred at Ballarat, Victoria, on October 23, 1928, at the age of sixty years, after a brief illness.

William Edward Davies was a son of the late Isaac Davies, an early resident of Ballarat. He was born at Sebastopol, Victoria, in 1868 and was educated at Grenville College, Ballarat and later at the Melbourne University where he graduated as bachelor of medicine and bachelor of surgery. He was shortly afterwards appointed resident surgeon at the Ballarat Hospital and from there entered private practice in Ballarat which he continued till his death thirty-three years later. He built up a very large and successful practice which consisted largely of surgery and in this he gained a high reputation. During the Great War he was not accepted for active service owing to his age, but he served as medical officer on transports and served in Egypt for some months.

He was Honorary Surgeon to the Ballarat Hospital for fifteen years and was associated with many public bodies in Ballarat. At various times he was President of the Mechanics Institute, the Rowing Club and the Central Bowling Club. As a citizen he always took his full share of any duties that fell to him.

William Edward Davies was of sterling character, absolutely straightforward, kindly and courteous. His passing is mourned by all who knew and loved him. He is survived by a widow, two sons and two daughters to whom the sympathy of the profession is extended.

Dr. A. Norman McArthur writes:

I have known Dr. W. E. Davies for forty years which is a long time for two men in friendship, and as the years passed the deeper grew the friendship.

Even in his young days Will. Davies was an idealist. He had an implicit trust in human nature; not a simple trust, as he was almost instinctively and rapidly selective as to what was good and what bad in a man. Fastidious in the selection of his friends, he never forgot them and breathed loyalty to them ever after. As a student he lived an ordered life, working diligently at his books and getting the best he could from his clinics. He was more serious minded than most of the students of his time. He was at his best at night when we put our books away, lit our pipes and talked of our philosophy of life.

His attitude towards life was of the kindly, tolerant nature with a hopeful outlook for the future. I never

heard him say a bitter word on any subject. Later in his practice I found his patients revered him for his kindness and gentleness apart from his skill. He was artistic in temperament and passionately fond of music and delighted in the work of the old masters in both music and art.

Wide reading and a good memory made him a most interesting talker. I don't think he ever came to Melbourne without coming to see me and before he became Surgeon to In-patients at the Ballarat Hospital, he habitually came to see me at work in my operating theatre twice a month. Ballarat was his home town, of which he was very proud.

One Sunday, after dining at his home, he took me to see the civic beauties of his town and there were many. He spoke with real reverence of those great-hearted pioneers who had been always ready to help beautify or improve his beloved city.

To him Pope's lines seem almost applicable:

Statesman, yet friend to truth! of soul sincere,  
In action faithful, and in honour clear;  
Who broke no promise, served no private end,  
Who gained no title and who lost no friend.

#### WILLIAM JACK OSMOND WALKER.

We regret to announce the death of Dr. William Jack Osmond Walker which occurred at Sydney on November 30, 1928.

#### JOSEPH VINCENT HIGGINS.

We announce with regret the death of Dr. Joseph Vincent Higgins which occurred at Melbourne on November 30, 1928.

### Correspondence.

#### RADIUM TREATMENT OF TUMOURS OF THE JAW.

SIR: I have read with interest Dr. Percival Pickerill's report upon four jaw tumours, contained in the journal of November 10, but find myself at a loss to determine the exact meaning which he intends to convey by the statement: "The failure of radium to effect any satisfactory result in epithelial growths in the mouth or jaws seems to be generally recognized and this is illustrated in Case IV."

Earlier in his report Dr. Pickerill has described Case IV as an "epithelial odontoma." Does Dr. Pickerill limit his unfavourable criticism of radium treatment to epithelial odontomata or does he apply it to all epithelial growths of the mouth and jaws (gums)? If the latter, I emphatically disagree with his dictum. The outstanding feature of cancer work in the last decade has been the great development in the successful use of radium in the treatment of epitheliomata, including those of the mouth, which has followed upon the adoption (with or without minor modifications) of the technique and principles laid down by Regaud, of Paris. In New York and Paris radium has now superseded surgery in the treatment of such cases.

In any event I would suggest that it is time that estimates of the benefits and analyses of the results of radium treatment, as carried out by the employment of ten milligramme units, should be abandoned. To obtain the best results the radium units should not exceed one milligramme of the element, screened with 0.5 millimetre of platinum-iridium and distributed according to the general ratio of one milligramme of radium per cubic centimetre of tissue, the exposure time varying from five to twenty-one days, according to the circumstances of the case.

May I also protest against medical literature being further encumbered with "reports" upon radium treatments in which the relationship of the radium applicators to the tissues, the screening of the radium and the period of application are not each exactly specified. These data

are especially necessary in Australia where there is as yet no uniform standardization of applicators or techniques and the majority of treatments are still carried out by the older, empirical and relatively ineffective methods.

Yours, etc.,

A. H. THWAITES,  
Honorary Radiologist,  
Alfred Hospital, Melbourne.

12, Collins Street, Melbourne.  
November 26, 1928.

#### MEMORIAL TO THE LATE HARRY JOHN CLAYTON.

THE friends of the late Harry John Clayton have determined to take steps to perpetuate his memory. It is proposed to found at the University of Sydney a prize which will bear his name. It is thought that many members of the medical profession would like to take a part in the carrying out of this scheme. Donations may be sent to Eric R. Mitchell, Esquire, Chartered Accountant, 350, George Street, Sydney, and will be acknowledged in the pages of this journal.

#### THE ROBERT OLIVER DOUGLAS MEMORIAL FUND.

THE practitioners of Hamilton, Victoria, have resolved to erect a memorial to the late Robert Oliver Douglas who died on February 9, 1928. The fund will close in a very short time and we are therefore asking the friends of our lamented colleague to forward their contributions to the editor of the *Hamilton Spectator* as promptly as possible. The movement has been instituted by Dr. George Cole, the Honorary Secretary of the South-Western Sub-division of the Victorian Branch of the British Medical Association.

#### Corrigendum.

DR. J. F. CHAMBERS has called our attention to an error which appears in his paper on basal metabolism, published in the issue of December 1, 1928. On page 679 in the thirty-fourth line of the second column the word hyperthyreoidic should be hypothyreoidic.

#### Books Received.

DISEASES OF THE GALL BLADDER AND BILE DUCTS: A BOOK FOR PRACTITIONERS AND STUDENTS, by Everts Ambrose Graham, A.B., M.D.; Warren Henry Cole, B.S., M.D.; Glover H. Copher, A.B., M.D., and Sherwood Moore, M.D.; 1928. Philadelphia: Lea and Febiger; Sydney: Angus and Robertson. Royal 8vo., pp. 477, with illustrations. Price: 30s. net.

#### Diary for the Month.

- DEC. 17.—New South Wales Branch, B.M.A.: Organization and Science Committee.  
DEC. 18.—Tasmanian Branch, B.M.A.: Council.  
DEC. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee.  
DEC. 19.—Central Northern Medical Association, New South Wales.  
DEC. 21.—Queensland Branch, B.M.A.: Council.

#### Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xx.

- LAUNCESTON PUBLIC HOSPITAL: Junior Resident Medical Officer (Male).  
MELBOURNE HOSPITAL: Medical Vacancies.  
ROYAL NORTH SHORE HOSPITAL OF SYDNEY: Junior Resident Medical Officer (two vacancies).  
THE ADELAIDE CHILDREN'S HOSPITAL: Honorary Physician to In-Patients.

#### Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

| BRANCH.                                                                          | APPOINTMENTS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NEW SOUTH WALES:<br>Honorary Secretary,<br>30 - 34, Elizabeth<br>Street, Sydney. | Australian Natives' Association.<br>Ashfield and District Friendly Societies' Dispensary.<br>Balmain United Friendly Societies' Dispensary.<br>Friendly Society Lodges at Casino.<br>Leichhardt and Petersham Dispensary.<br>Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney.<br>Marrickville United Friendly Societies' Dispensary.<br>North Sydney United Friendly Societies.<br>People's Prudential Benefit Society.<br>Phoenix Mutual Provident Society. |
|                                                                                  | All Institutes or Medical Dispensaries.<br>Australian Prudential Association Proprietary, Limited.<br>Mutual National Provident Club.<br>National Provident Association.<br>Hospital or other appointments outside Victoria.                                                                                                                                                                                                                                                           |
| VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.             | Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing.<br>Brisbane United Friendly Society Institute.<br>Stannary Hills Hospital.                                                                                                                                                                                                                                        |
| QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.      | All Contract Practice Appointments in South Australia.<br>Boomerang Centre Medical Club.                                                                                                                                                                                                                                                                                                                                                                                               |
| SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.                       | All Contract Practice Appointments in Western Australia.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.       | Friendly Society Lodges, Wellington, New Zealand.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Medical practitioners are requested not to apply for appointments to position at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

#### Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

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